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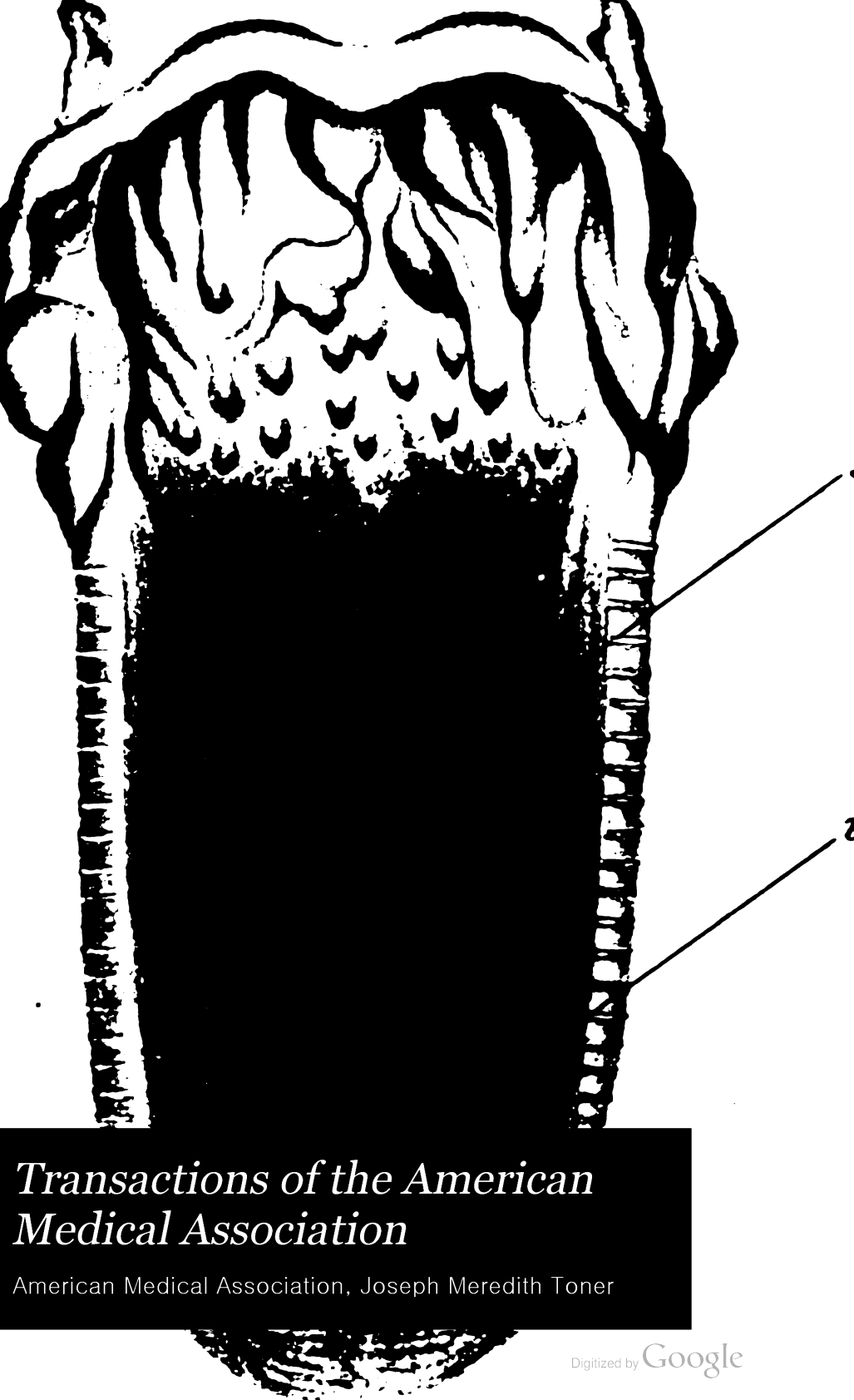

Transactions of the American Medical Association

American Medical Association, Joseph Meredith Toner

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THE

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OF THE

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By a Resolution passed at the session of 1851, the Committee of Publication were instructed to print conspicuously, at the beginning of the volume of the *Transactions*, the following disclaimer:—

"The American Medical Association, although formally accepting and publishing the Reports of the various Standing Committees, holds itself wholly irresponsible for the opinions, theories, or criticisms therein contained, except when otherwise decided by special resolution."

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MINUTES

OF THE

TWENTIETH ANNUAL MEETING

OF THE

AMERICAN MEDICAL ASSOCIATION,

Held in the City of New Orleans, May 4th, 5th, 6th, 7th, 1869.

THE Association convened at the Mechanics' Institute on Tuesday, May 4, at 11 A.M., and was called to order by the President, WM. O. BALDWIN, M.D., of Alabama, assisted by Vice-Presidents GEORGE MENDENHALL, M.D., of Ohio, and S. M. BEMISS, M.D., of Louisiana.

The Permanent Secretary, WM. B. ATKINSON, M.D., of Pennsylvania, and the Assistant Secretary, A. J. SEMMES, M.D., of Georgia, were present.

The President invited to seats on the platform, WARREN STONE, M.D., and A. LOPEZ, M.D., of Louisiana, and ex-Presidents H. F. ASKEW, M.D., of Delaware, N. S. DAVIS, M.D., of Illinois, and ALDEN MARCH, M.D., of New York.

The session was opened with prayer by Rev. JOHN N. GALLAHER, of New Orleans.

The Committee of Arrangements, through their Chairman, T. G. RICHARDSON, M.D., of Louisiana, welcomed the Association in the following remarks:—

"*Mr. President and Gentlemen of the Association:*

"As Chairman of the Committee of Arrangements, for which position I am indebted to your gracious consideration, it is no less my privilege than my duty to extend to you, on the part of the physicians of New Orleans, the hand of greeting, and to bid you

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a hearty welcome to the once gay and brilliant metropolis of the South. During the twenty-one years of the existence of the Association, this is the first time that we of the Southwest have been permitted to exhibit in your presence our high appreciation of your labors for the advancement of the science of medicine, and for the further development of that unity of sentiment which, despite the popular reproach to the contrary, constitutes one of the distinguishing marks of the medical profession.

"But notwithstanding we have been heretofore passed by in your annual visitations, let me assure you that we have not been uninterested lookers-on, but have watched with deep concern your noble efforts in the cause of truth, and offered up our prayers for the complete success of all your grand designs. What these designs are, is clearly set forth in your annual volume of *Transactions*. They embrace, if I mistake not, the overturning and expulsion of all that is empirical in the profession, and the incorporation of all that is useful and true. Such, indeed, is the mission of all recognized science, and in no department has greater progress been made during the past half century than in medicine. Even during the short life of this Association, which, if I am correctly informed, celebrates its majority to-day, what vast changes have taken place in the doctrines of the profession, what great advances have been made in the treatment of disease! As evidence of this, I need only refer, on the one hand, to our increased knowledge of the physiology and pathology of the nervous system, and the enlargement given to the zymotic theory; and, on the other, to the numerous additions made to the materia medica, and the wonderful improvements in the procedures of the operative surgeon, during this brief period.

"But as in the growth and maintenance of the animal body nutrition presupposes waste, so in the progressive development of science does the introduction of that which is permanent and true imply the rejection of that which is temporary and false. To carry on this double work through all its minute and complicated details, union and organization of individual effort are absolutely necessary. That much of the progress which has been heretofore made is due to the systematic combination of those of similar pursuits, the records of the scientific societies of Great Britain and France clearly prove. And that something of a like encouraging nature has been already effected by your Association, your felt and growing influence throughout the land abundantly testifies.

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"In addition to these, which are the special objects of the Association, there is another, which, although incidental and secondary, is scarcely less potent in its influence for good. I allude to the amity and fellowship which flow from the personal contact and the interchange of courtesies among its members at these annual meetings. And I may be permitted to say, Mr. President, that, in consequence of the distrust which still to some extent prevails between those who were so lately in antagonism, this much-desired result held a controlling position in our hearts when we invited your Association to assemble in our city. We thank you, gentlemen, we thank you sincerely, for your cordial response to this invitation; and I assure you that it is with great gratification and pride that we witness this undoubted manifestation of the oneness of the medical profession throughout the entire United States of America.

"But while expressing our great pleasure in being honored by your presence, I must apologize for the meagreness of our means to interest your leisure hours. Accustomed as you have been heretofore to meet in cities abounding in wealth and in those facilities for entertainment which wealth creates, you will be not a little disappointed, I fear, at the small provision we have made for your enjoyment. Yet, despite the poor appearance which we present in consequence of the heavy afflictions under which our people have suffered for the past six or eight years, I doubt not you will find much to interest you in and around the Crescent City. We can show you no such architectural monument as that which was illuminated for your benefit last year in Washington City; we have no collections of paintings or of statuary by which to gratify your taste for the fine arts; we have no large museums of historic mementos of what our forefathers suffered or enjoyed; no conquerors' tombs; no trophies to tell of conquests over our fellow mortal man. But, in place of these, we can show you a great city whose foundations, like those of St. Petersburg, are laid in the 'waters under the earth;' whose superficial crust of dry soil has been rescued by the hand of man from the overflowing tide; whose very life for more than one hundred and fifty years has been one unremitting struggle against the ever-threatening floods and the noisome pestilence. We can point you to a river which traverses twenty degrees of latitude, which drains nearly one-third of the entire continent, and which, with its tributaries, constitutes a navigable stream long enough to encircle the globe. We can direct

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your walks along one of the most extensive and busy wharves to be found in any part of the world. We can show you upon our broad and luxuriant savannas and in our cultivated gardens a flora unsurpassed in beauty and variety by that of any part of the world. We can exhibit institutions of learning and benevolence of which any city might be proud. And lastly, but not to mention all, we can introduce you to a people whose honest pride has not been broken by defeat, whose recuperative powers are quite equal to the misfortunes they have endured, and whose hearts beat with warmest regard for those whose mission it is to heal the bruises and bind up the wounds of our common humanity."

Dr. RICHARDSON offered the following programme for the meetings and entertainment of the Association:—

The sessions will be held from 9 A.M. to 2 P.M.; and the Sections will meet at 3 P.M., in the Mechanics' Institute and in the University.

Entertainments and Receptions.

Tuesday, May 4.

Reception at the Mechanics' Institute, at 8 P.M.

Friday, May 7.

An excursion down the Mississippi River, to the plantation of Effingham Lawrence, Esq.

The Committee of Arrangements reported the following as duly accredited delegates and permanent members, comprising a total of 193:—

ALABAMA.

Medical Association of the State of Alabama,	ROBERT TOWNES ABERNATHY, WILLIAM OWEN BALDWIN, JAMES BERNEY, JOHN MCWHORTER CLARK, JEROME COCHRAN, EDMOND HENRY FOURNIER, FRANCIS MASON HEREFORD, JAMES FOUNTAIN HEUSTES, LAWRENCE AURELIUS MCCLOSKEY, EDWARD DAVIES MCDANIEL, ROBINSON MILLER, ISAIAH DUBOSE MORGAN,

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Medical Association of the State of Alabama,	ABNER MCCARTY OLIVER, THOMAS CHILDRESS OSBORN, PASCAL HARRISON OWEN, WALTER PETERSON REESE, BENJAMIN HOGAN RIGGS, SAMUEL DIBBLE SEELYE, JOB SOBIESKI WEATHERLY.
Medical College of Alabama,	FRANCIS ARMSTRONG ROSS.
Mobile Medical Society,	EDMUND PENDLETON GAINES.
Montgomery Med. and Surgical Society,	RICHARD FRASER MICHEL, GEO. FITZ EDWARD POLLARD.
Talladega Medical Society,	JOE HENRY JOHNSON.
Permanent Members,	JAS. THEOPHILUS HARGRAVES, AUGUSTUS JORDAN REESE.

ARKANSAS.

Little Rock Medical Association,	ROSCOE GREENE JENNINGS, CLAIBOURNE WATKINS.

DELAWARE.

Delaware State Medical Society,	HENRY FORD ASKEW.

DISTRICT OF COLUMBIA.

Howard University, Med. Dept.,	ROBERT REYBURN.
Medical Association of the District of Columbia,	WILLIAM JAMES CHAMBERLIN, W. I. C. DUHAMEL, CHARLES FRANCIS NALLEY, LEWIS WARFIELD RITCHIE, JOSEPH MEREDITH TONER, JOHN KEARNY WALSH.

GEORGIA.

Georgia Medical Society,	ALEXANDER JENKINS SEMMES, ROBERT MARK SMITH.
Savannah Medical College,	RICHARD DENNIS ARNOLD.

ILLINOIS.

Æsculapian Society of Wabash Valley,	WM. MORTIMER CHAMBERS.
Chicago Medical College,	NATHAN SMITH DAVIS.
Chicago Medical Society,	ABRAHAM GROESBECK, WILLIAM JOHN JOHNSON.

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Cook County Hospital (Chicago),	THOMAS DAVIS FITCH.
Illinois State Medical Society,	GEORGE RICHARD BIBB, JOSEPH ORMOND HAMILTON, THOMAS GIDEON HICKMAN, HENRY STERLING HURD.
Military Tract Med. Association,	HIRAM NANCE, CURTIS ETHELBERT PRICE.
St. Luke's Hospital (Chicago),	HEBER SMITH.
St. Mary's Infirmary (Cairo),	HORACE WARDNER.

INDIANA.

Indiana State Medical Society,	BENJ. STUDLEY WOODWORTH.
Medico-Chir. Society of Madison,	JOSEPH GOODWIN ROGERS.
Wayne County Medical Society,	JAMES FARQUHAR HIBBERD.

IOWA.

Iowa and Illinois Central District Medical Association,	EDWARD HALE BOWMAN.

KENTUCKY.

Covington and Newport Med. Soc.,	WM. WARTON HENDERSON.
Kentucky School of Medicine,	EDWIN SAMUEL GAILLARD, JAS. MONTGOMERY HOLLOWAY.
Kentucky State Medical Society,	JOHN DILLARD, RICHARD WILLIAM DUNLAP, JOSIAH HALE, JOHN DAVIES JACKSON, WILLIAM U. MARTIN, SAMUEL BLACKBURN MILLS, HENRY MARTYN SKILLMAN, JOHN ELLIOTT WOODBRIDGE.
Med. Dept. University of Louisville,	GEORGE WOOD BAYLESS, LUMSFORD PITT YANDELL, Jr.
Permanent Member,	JAMES MILES BUSH.

LOUISIANA.

Baton Rouge Medical Society,	THOS. JEFFERSON BUFFINGTON.
Charity Hospital (New Orleans),	STEPHEN SOLON HERRICK, ANDREW WOODS SMYTH.
East Feliciana Medical Society,	ALEXANDER PORTER BROWN, OWEN PALMER LONGWORTHY.

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Freedmen's Hospital (N. Orleans),	A. C. SWARTZWELDER.
Hôtel Dieu (New Orleans),	PIERRE CAVERLY BOYER.
Med. Association of New Orleans,	OCTAVUS ANFAUX, CHARLES TURPIN, JOHN ADAMS GIDEON FISHER, SAMUEL LOGAN, BENJAMIN HART MOSS.
Med. Dept. Univ. of Louisiana,	STANFORD EMERSON CHAILLE, WARREN STONE, Sr.
New Orleans School of Medicine,	WILLIAM STANTON MITCHELL, HOWARD SMITH.
New Orleans Academy of Sciences, Medical Section,	JAMES BURNS.
Permanent Members,	CORNELIUS BEARD, SAMUEL MERRIFIELD BEMISS, JOSEPH JONES, TOBIAS GIBSON RICHARDSON.

MICHIGAN.

Detroit Medical College,	GEORGE PIERCE ANDREWS, EDWARD WATROUS JENKS.
Genesee County Med. Association,	HENRY CARLETON FAIRBANK.
Med. Dept. University of Michigan,	ALONZO BENJAMIN PALMER.
Permanent Member,	JOHN BRICK WHITE.

MINNESOTA.

Minnesota State Medical Society,	CHARLES NATHANIEL HEWITT.

MISSISSIPPI.

Adams County Medical Society,	WALTER ERNEST BONDURANT, JAMES STEBBINS KING.
Jefferson Co. Med. Association,	NAPOLEON LORENZO GRICE, WILLIAM TORRY MCARN.
Med. Society of Madison County,	ALPHONSO THOMAS SEMMES, GEORGE WASHINGTON SMITH.
Mississippi Medical Association,	WM. MCCORKLE COMPTON, M. SIDNEY CRAFT, SAMUEL PRENTISS CUTLER, FRANCIS WILLIAM DANCY, KINSMAN CLINTON DIVINE, WILLIAM YOUNG GADBERRY,

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Mississippi Medical Association,	CHARLES BETTS GALLOWAY, EDWARD WILLIAM HUGHES, THOMAS DUDLEY ISOM, ROBERT KELLS, JONAS PATRICK MOORE.
Mississippi State Lunatic Asylum,	ALFRED BARWELL CABANISS.
Vicksburg Medical Society,	JAMES RICHARDS BARNETT, DAVID WINFIELD BOOTH.

MISSOURI.

Missouri Medical College,	JOHN SIDNEY MOORE.
Missouri State Medical Society,	WM. MARCELLUS MCPHEETERS.
St. Louis Medical Society,	HOMER JUDD.

NEW YORK.

Albany Medical College,	ALDEN MARCH.
Chenango County Medical Society,	GEORGE DOUGLAS.
East River Medical Society,	WILLIAM FAULDS THOMS.
Medical Association, Eastern District of New York,	NELSON LUTHER NORTH.
Medico-Legal Society (New York),	EDW'D HERMAN MILLER SELL.
Medical Society of the State of New York,	GEORGE BURR, LEWIS ALBERT SAYRE, LAKE INNOCENT TEFFT.
New York Academy of Medicine,	EUSEBIUS LEE JONES, JOHN POOL GARRISH.
New York County Med. Society.	BENJ. FREDERICK DAWSON, JEROME CANDEE SMITH, MARCUS PENDLETON STEPHENSON.
Rensselaer County Med. Society,	MATTHEW HENRY BURTON.

OHIO.

Acad. of Medicine (Cincinnati),	ARCHIBALD E. HEIGHWAY, WILLIAM HEBERDEEN MUSSEY.
Cincinnati Med. and Library Club,	STEPHEN OLNEY ALMY.
Erie County Medical Society,	HENRY JAMES DUNAHOE.
Hardin County Medical Society,	WILLIAM MAHAN CHESNEY.
Medical College of Ohio,	THEOPHILUS PARVIN.
Miami Medical College,	GEORGE MENDENHALL.

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Ohio State Medical Society,	JOSEPH CLARK BROWN, JOSEPH HELMICK, LEAVITT THAXTER PEASE.
Wayne County Medical Society,	JOSEPH HENRY TODD.
Permanent Members,	BENJAMIN STANTON BROWN, JOHN TOWNSEND.

PENNSYLVANIA.

Alleghany County Med. Society,	JOHN HANSON GRONARD, ALEX. MCCANDLESS POLLOCK.
Blair County Medical Society,	WILLIAM MARTIN FINDLEY.
College of Physicians of Philadelphia,	DANIEL MURRAY CHESTON.
Cumberland County Med. Society,	JOHN JACOB ZITZER.
Philadelphia County Med. Society,	ISAAC STOUFFER ESHLEMAN.
Medical Society of the State of Pennsylvania,	WILLIAM JAMES ASDALE, BUCKLAND GILLETT, THOMAS MCKENNON.
Union Med. Association of Philadelphia,	WILLIAM TERRY TAYLOR.
University of Pennsylvania,	FRANCIS GURNEY SMITH.
Permanent Member,	WILLIAM BIDDLE ATKINSON.

RHODE ISLAND.

Rhode Island State Med. Society,	WILLIAM TOWNSEND BULLOCK, GEORGE LEWIS COLLINS.

TENNESSEE.

Montgomery County Med. Society,	DANIEL FLEMING WRIGHT.
Nashville Medical Society,	FRANCIS MARION HUGHES.
St. Vincent's Hospital,	CLARENCE LINEN LEWIS.
Tennessee Medical Society,	HENRY MACLIN COMPTON, PAUL FITZIMONS EVE, JOHN BERRIEN LINDSLEY, SAMUEL NEWTON MCMINN, JOSEPH EDWARD MANLOVE, ALEXANDER RUFUS PINKSTON, REZIN THOMSON, EARNEST WILLIAM THURM.
University of Nashville,	WILLIAM KENDELL BOWLING, WILLIAM THOMPSON BRIGGS.

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TEXAS.

Galveston Medical College,	GREENSVILLE DOWELL.
Galveston Medical Society,	THOMAS JEFFERSON HEARD, WILLIAM DENNIS KELLEY, SAMUEL MULLINS WELCH.
Washington County Medical Association,	F. MATCHETT, GREGOR CARMICHAEL MCGREGOR, JAMES THOMAS NORRIS.

WEST VIRGINIA.

Medical Society of the City of Wheeling and County of Ohio,	JOHN C. HUPP.
Medical Society of the State of West Virginia,	WILLIAM JOURDAN BATES, JOHN FRISSELL.

WISCONSIN.

Milwaukee City Med. Association,	JOHN KNOWLTON BARTLETT.
Wisconsin State Medical Society,	HARMON VAN DUSEN.

ARMY AND NAVY.

Medical Department U. S. Army,	JOHN SHAW BILLINGS, BENNETT AUGUSTIN CLEMENT, JOSEPH JANVIER WOODWARD.
Medical Department U. S. Navy,	NINIAN PINKNEY, FREDERICK ENSIGN POTTER.

The following gentlemen were elected during the session as members by invitation:—

EMANUEL ADLER,	New Orleans, La.
JOHN GOOLD DYER,	" "
EDWARD TAYLOR SHEPHERD,	" "
CHAS. JASPER BICKHAM,	" "
JOHN CECIL LEGARÉ,	" "
MORITZ SCHUPPERT,	" "
SAMUEL CHOPPIN,	" "
WM. GLOVER AUSTIN,	" "
CHAS. HURST KELLY,	" "
WM. HAMILTON WATROUS,	" "
JOHN MERRILL CULLEN,	" "
PETER BEEKMAN MCKELVEY,	" "

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BENJAMIN STILLÉ,	New Orleans, La.
SETH RICHARDSON HURD,	" "
F. H. DENNIS,	" "
GEO. WILLIAMS LEWIS,	" "
CHRISTOPHER H. TIBAULT,	" "
WM. C. WILSON,	" "
JOHN CARTER,	" "
J. BENSADEN,	" "
GEO. WHITFIELD AVERY,	" "
WM. P. MCMILLAN,	Trinity, La.
PIERRE CLEMENT TIRCUIT,	Cantrelle, La.
WM. GREEN WRIGHT,	Eldorado, Ark.
MILES HAMPTON HARPER,	Harrisonburg, La.
STEWART L. HENRY,	Carrollton, "
JAMES EPPES MORRIS,	New Iberia, "

Vice-President GEO. MENDENHALL having taken the chair, the President delivered the Annual Address.

On motion of Dr. H. F. ASKEW, of Delaware, it was referred to the Committee of Publication.

Letters were read by the Permanent Secretary from Drs. S. D. GROSS, of Pennsylvania, W. BYARD and W. CANNIFF, of Canada, and R. A. KINLOCH, Chairman of the Medical Society of South Carolina, expressing regret at their inability to be present on this occasion.

Reports of special committees being next in order, they were called, with the following result:—

On Disease of the Cornea, Dr. JOS. S. HILDRETH, of Illinois, Chairman. No report.

On the Cultivation of the Cinchona-tree, Dr. LEMUEL J. DEAL, of Pennsylvania, Chairman, reported progress, and, on motion of Dr. TONER, of the District of Columbia, Dr. T. ANTISELL, of the District of Columbia, was added to the Committee.

On Excision of Joints for Injuries, Dr. J. B. REED, of Georgia, Chairman. No report.

On Alcohol and its Relations to Medicine, Dr. JOHN BELL, of Pennsylvania, Chairman, presented a report, which was referred to the Section on Practice of Medicine and Obstetrics.

On the Cryptogamic Origin of Disease, with Special Reference to the recent Microscopic Investigations on that Subject, Dr. EDWARD

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CURTIS, of the U. S. Army, Chairman, presented a report, which was referred to the Section on Meteorology and Epidemics.

On Operations for Harelip, Dr. A. HAMMER, of Missouri, Chairman. No report.

On Clinical Thermometry in Diphtheria, Dr. JOS. G. RICHARDSON, of New York, Chairman, requested to be discharged, which was granted.

On Prophylactics in Zymotic Diseases, Dr. NELSON L. NORTH, of New York, Chairman, presented a report, which was referred to the Section on Meteorology and Epidemics.

On Inebriate Asylums, Dr. C. H. NICHOLS, of the District of Columbia, Chairman. No report.

On the Influence of the Pneumogastric Nerve on Spasmodic and Rhythmical Movements of the Lungs, Dr. THOMAS ANTISELL, of the District of Columbia, Chairman. No report.

To Examine into the Present Plan of Organization and Management of the United States Marine Hospitals, Dr. D. W. BLISS, of the District of Columbia, Chairman. No report.

On the Utilization of Sewerage, Dr. STEPHEN SMITH, of New York, Chairman. No report.

On the Influence of Quarantine in Preventing the Introduction of Disease into the Ports of the United States, Dr. ELISHA HARRIS, of New York, Chairman. No report.

On Nurse-training Institutions, Dr. SAMUEL D. GROSS, of Pennsylvania, Chairman, presented a report, which was referred to the Section on Practical Medicine and Obstetrics.

On Commissioners to Aid in Trials involving Scientific Testimony, Dr. JOHN ORDRONAUX, of New York, Chairman, presented a report, which was referred to the Section on Medical Jurisprudence, Hygiene, etc.

On Annual Medical Register, Dr. JOHN H. PACKARD, of Pennsylvania, Chairman, reported progress, and, on motion of Dr. MUSSEY, of Ohio, it was

Resolved, That each State Medical Society be requested to prepare an annual register of all the regular practitioners of medicine in their respective States, giving the names of the colleges in which they may have graduated, and date of diploma or license.

On Devising a Plan for the Relief of Widows and Orphans of Medical Men, Dr. JOHN H. GRISCOM, of New York, Chairman, presented a report, which was referred to the Committee of Publication.

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On Veterinary Colleges, Dr. THOMAS ANTISELL, of the District of Columbia, Chairman, reported progress, and was continued.

On Specialties in Medicine, and the Propriety of Specialists Advertising, Dr. E. LLOYD HOWARD, of Maryland, Chairman, presented a report, which was, on motion, made the special order for Wednesday, at 12 M.

On Library of American Medical Works, Dr. J. M. TONER, of the District of Columbia, Chairman, presented a report, which was, on motion of Dr. DAVIS, made the special order for Wednesday, at 1 P.M.

On Vaccination, Dr. HENRY A. MARTIN, of Massachusetts, Chairman. No report.

On the Decomposition of Urea in Uræmic Poisoning, Dr. H. R. NOEL, of Maryland, Chairman. No report.

On the Best Method of Treatment for the Different Forms of Cleft Palate, Dr. W. R. WHITEHEAD, of New York, Chairman, presented a report, which was referred to the Section on Surgery and Anatomy.

On Rank of Medical Men in the Navy, Dr. N. S. DAVIS, of Illinois, Chairman, announced that their last year's report was final, and, on motion, the Committee was discharged.

The report on *Medical Ethics*, by Dr. D. FRANCIS CONDIE, of Pennsylvania, Chairman, was read by Dr. DAVIS, and adopted.

On American Medical Necrology, Dr. C. C. COX, of Maryland, Chairman, reported progress, and was continued. On motion of Dr. DAVIS, Dr. COX was authorized to fill all vacancies on his committee, occasioned by members failing to report.

Voluntary communications were presented—

"On Mollities Ossium," by Dr. JOSEPH JONES, of Louisiana. Referred to the Section on Surgery, etc.

"On Cases of Lead Palsy from the Use of Cosmetics," by Dr. L. A. SAYRE, of New York. Referred to the Section on Hygiene, etc.

"On the Physiology and Chemistry of Longevity," by Dr. CUTLER, of Mississippi. Referred to the Section on Hygiene, etc.

"On the Protective and Preventive Uses of Quinine," by Dr. S. ROGERS, of New York. Referred to the Section on Practical Medicine, etc.

"On the Tongue in Malarious Diseases," by Dr. OSBORN, of Alabama. Referred to the Section on Practical Medicine, etc.

"On the Warm Cerebro-Spinal Bath in the Treatment of Congenital Apnœa, and on a New Method of Artificial Respiration,"

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by E. D. McDaniel, of Alabama. Referred to the Section on Practical Medicine, etc.

Reports on Climatology and Epidemics were received from Drs. Wm. Faulds Thoms, of New York, T. J. Heard, of Texas, F. W. Hatch, of California, and E. A. Hildreth, of West Virginia; which were severally referred to the Section on Climatology and Epidemics.

Reports of progress were received from Drs. R. C. Hamill, of Illinois, A. Sager, of Michigan, Wm. Compton, of Mississippi, and L. T. Pimm, of Louisiana.

On motion of Dr. Davis, the report on the revision of the plan of organization, laid over from last year, was made the special order for Wednesday, at 10 A.M.

Papers relative to medical education were read, and, on motion of Dr. Davis, were referred to a special committee of five, to be appointed by the President.

The President appointed Drs. N. S. Davis, of Illinois, P. F. Eve, of Tennessee, E. S. Gaillard, of Kentucky, E. Lee Jones, of New York, and J. K. Bartlett, of Wisconsin.

On motion, the Association adjourned until Wednesday, at 9 A.M.

SECOND DAY.

Wednesday, May 5.

At 9 A.M., the President, Dr. W. O. Baldwin, called the Association to order.

The reading of the minutes was dispensed with.

A paper on "A New Canula Needle for Applying Ligatures in Vesico-Vaginal Fistula" was presented by Dr. P. F. Eve, of Tennessee, and was referred to the Section on Surgery, etc.

On motion of Dr. J. M. Bush, of Kentucky, the following was adopted:—

Resolved, That a committee of five members be appointed by the Chair, to take into consideration the subjects alluded to in the President's address, and report at this meeting.

The President selected as members of the Committee, Drs. T. Parvin, of Indiana (Chairman), J. M. Toner, of the District of Columbia, A. M. Pollock, of Pennsylvania, S. M. Welch, of Texas, and S. D. Seelye, of Alabama.

Dr. W. G. McPheeters, of Missouri, offered a communication

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from the Medical Association of that State, in reference to medical education.

On motion of Dr. TONER, of the District of Columbia, it was referred to a special committee on that subject.

Dr. EVE offered the minutes of the Medical Society of Tennessee, relative to the same subject, which was similarly referred.

Dr. E. S. GAILLARD, of Kentucky, offered the following preamble and resolutions, which were referred to the same committee:—

Whereas, The medical teachers of America have, after a trial of twenty-two years, failed to meet satisfactorily and efficiently the requirements of the great body of the profession in regard to medical education; and

Whereas, The condition of the profession is yearly becoming more deplorable, on account of the antagonistic and objectionable policy of medical schools, in making the amount of fees charged, rather than a successful teaching, the basis of competition; and

Whereas, To obtain professionally competent graduates, sound and efficient teachers are indispensably necessary; and

Whereas, Such teachers, to be found throughout the country, cannot be induced to leave their homes without the assurance of competent remuneration; and

Whereas, Such remuneration can only be obtained by adequate fees charged, unless by a system of low fees the *number* of students be relied upon to make up the inevitable pecuniary deficiency; and

Whereas, Reliance upon numbers of students for this purpose deplorably crowds the already overcrowded professional field, diminishing thereby individual income, judgment, experience, and skill, thereby compelling practitioners to resort to other avocations as a source of supplemental income; and

Whereas, This devotion to other pursuits often destroys opportunities for study and improvement, degrading thereby the status and standard of American physicians; and

Whereas, The schools of New England, New York, Pennsylvania, Maryland, Virginia, South Carolina, Alabama, Georgia, Texas, Tennessee, and District of Columbia now charge comparatively remunerative fees; and

Whereas, The low system of fees is charged in only a few of the Middle States, and can with advantage be made to conform to the rate of fees charged elsewhere; and

Whereas, It is as unethical for colleges to underbid each other pecuniarily as for practitioners to do so:

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Resolved, That hereafter no medical school in this country, other than those fully endowed, shall be entitled to representation in this Association, if the amount charged by such schools for a single course of regular lectures be less than one hundred and forty dollars.

Resolved, That all schools charging less than this sum are earnestly requested by this Association to advance their rate of fees to the amount mentioned.

The report of Dr. CHAS. A. LEE, of New York, the delegate to the Association of Superintendents of Insane Asylums, was offered, and referred to the Section on Psychology.

The report of Dr. S. D. GROSS, of Pennsylvania, delegate to foreign medical associations, was presented, together with his letter to Prof. EHRENBERG, as ordered by the Association at its last session, which were read and referred to the Committee of Publication.

The time having arrived for consideration of the revision of the plan of organization, it was, on motion, taken up.

On motion of Dr. HIBBERD, the following amendment to the Constitution, offered last year, was adopted:—

Add to Art. VII. the following: "Provided, however, that when an amendment is properly under consideration, and an amendment is offered thereto, germain to the subject, it shall be in order, and, if adopted, shall have the same standing and force as if proposed at the preceding meeting of the Association."

On motion, the following amendments to the Constitution, offered last year, were adopted:—

II. MEMBERS.

In this section, second paragraph, fourth line, insert after the words "United States" the words "from the army and navy."

In the fifth paragraph, third line, insert after the word "member" the words "or whose name shall have been, for non-payment of dues, dropped from the rolls of the same;" in the fifth line, same paragraph, after the word "sentence," read "or disability;" in the sixth line, after the word "society," add the following: "Or shall have paid up all arrears of membership; nor shall any person not a member and supporter of a local medical society, where such a one exists, be eligible to membership in the American Medical Association."

In the seventh paragraph, fifth line, strike out the remainder of the sentence after the word "by," and insert the words "at least

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three of the members present, or three of the absent permanent members." In the ninth line, after the word "delegates," add the words "except the right to vote."

In the eighth paragraph, fifth line, add after the word "delegates" the words "and comply with the requirements of the By-Laws of the Association."

In the ninth paragraph, third line, insert after the word "must" the words "exhibit his credentials to the proper committee."

III. MEETINGS.

In the first paragraph, third line, strike out after the word "shall" the words "never be the same for any two years in succession, and shall."

After the ninth paragraph insert the following new sentence: "Corresponding members shall consist of such medical gentlemen, eminent in their profession, residing out of the United States, as the Association shall from time to time elect."

IV. OFFICERS.

In the first paragraph, third line, after the word "Treasurer," insert the words "and Librarian." In the second line, after the word "Secretary," strike out the conjunction "and."

The following amendment was, after much discussion, unanimously rejected: In the third line, after the word "Librarian," insert the following new sentence: "The President shall be nominated and balloted for in open convention, and shall be elected only from those who have attended at least five annual meetings of the Association; and if on the first ballot no person receives a majority of the votes cast, the second ballot shall be confined to the three highest on the list; should no choice be then made, the candidate lowest on the list shall then be dropped. In the event of a tie on the third or succeeding ballot, the President shall decide by a casting vote."

The following were adopted:—

After the eighth paragraph insert a new paragraph, as follows: "The Librarian shall receive and preserve all the property in books, pamphlets, journals, and manuscripts presented to or acquired by the Association, record their titles in a book prepared for the purpose, acknowledge the receipt of the same, and he shall also be a member of the Committee of Publication."

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V. STANDING COMMITTEES.

In the second paragraph, second line, insert after the word "members" the words "of whom the Assistant Secretary shall be one."

In the third paragraph, first line, strike out the word "and." In the second line, after the word "Treasurer," read "and Librarian."

VI. FUNDS AND APPROPRIATIONS.

In the first paragraph, fifth line, insert after the word "the" the words "delegates and permanent." In the same line strike out the word "individual."

VII. PROVISION FOR AMENDMENT.

In the first paragraph, fourth line, strike out the word "members" and insert the word "delegate."

BY-LAWS.—III. STANDING COMMITTEES.

In the second paragraph, ninth line, strike out all after the word "resolution."

In the third paragraph, fourth line, after the word "receive," insert the word "original." In the same line, after the word "any," insert the word "medical."

In the third paragraph, eleventh line, strike out the word "volunteer," and insert the word "original."

In the sixth paragraph, second line, after the word "State," insert "and Territory." In the fourth line strike out the words "our country," and insert the words "their respective States and Territories." In the same line strike out all after the word "and," and insert the words "shall transmit them to the chairman of this committee on or before the first of April of each and every year."

V. ASSESSMENTS.

In the fourth line strike out the word "the," and in the same line all after the word "expenses" to the end of the sentence.

In the second paragraph, first line, strike out all after the word "invitation," and insert the following sentences: "Permanent members not in attendance shall transmit their dues to the Treasurer. Any permanent member who shall fail to pay his annual dues for three successive years, unless absent from the country, shall be dropped from the roll of permanent members."

On motion of Dr. DAVIS, of Illinois, the amendment was amended

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as follows: "After having been notified by the Secretary of the forfeiture of their membership."

The amendment was adopted as amended.

The following were adopted as read:—

VII. DELEGATES TO FOREIGN MEDICAL SOCIETIES.

In the first paragraph, fourth line, after the word "Europe," insert the words "or other foreign countries."

X. OF THE PREVIOUS QUESTION.

When the previous question is demanded, it shall take at least twenty members to second it; and when the main question is put under force of the previous question and negatived, the question shall remain under consideration the same as if the previous question had not been enforced.

A recess was taken, to allow the selection of members of the Committee on Nominations.

On reassembling, the Permanent Secretary announced the following as the Committee on Nominations:—

New York, J. C. SMITH; Delaware, H. F. ASKEW; Pennsylvania, A. M. POLLOCK; Kentucky, H. M. SKILLMAN; Tennessee, J. B. LINDSLEY; Mississippi, W. Y. GADBERY; Alabama, JEROME COCHRAN; Ohio, JOHN TOWNSEND; Indiana, B. S. WOODWORTH; Illinois, T. D. FITCH; Wisconsin, H. VAN DUSEN; Missouri, J. S. MOORE; Michigan, J. B. WHITE; Georgia, R. D. ARNOLD; Louisiana, S. LOGAN; Texas, S. M. WELCH; Minnesota, C. N. HEWITT; Arkansas, R. G. JENNINGS; West Virginia, W. J. BATES; Rhode Island, G. L. COLLINS; District of Columbia, L. W. RITCHIE; United States Army, J. J. WOODWARD; United States Navy, F. E. POTTER.

Dr. S. E. CHAILLÉ, of Louisiana, submitted a proposition for a common medical nomenclature in the United States, taking as a model an official publication on the subject by the Royal College of Physicians of London, and offered the following resolution, which was adopted:—

Resolved, That a committee of five be appointed by the President, to report, as soon as practicable, to the present session of this Association, upon the following:—

1. The propriety of adopting, and using its influence to have adopted, by the entire medical profession in the United States, the

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provisional "Nomenclature of Diseases of the Royal College of Physicians."

2. On the practicability of having this nomenclature published in such manner as may render it easily and cheaply accessible to every member of the profession.

3. To recommend such other practical measures for the action of this Association as may be necessary to introduce this nomenclature into official (military, naval, etc.) and general use.

The Chair appointed the following gentlemen as the Committee: Drs. S. E. CHAILLE, of Louisiana (Chairman), J. J. WOODWARD, of the U. S. Army, A. B. PALMER, of Michigan, J. F. HUESTIS, of Alabama, and F. G. SMITH, of Pennsylvania.

Dr. COCHRAN, of Alabama, offered the following amendments to the Constitution, which were laid over under the rules:—

1. Section 2, paragraph 1: That the clause "as members by invitation" be stricken out.

2. That the second paragraph be stricken out.

3. That of paragraph fourth all shall be stricken out except the first sentence.

4. That paragraph seven, of "members by invitation," be stricken out.

The reports of the Committee of Publication and the Treasurer were read, accepted, and referred to the Committee of Publication.

On motion, the Committee on Nominations were permitted to retire for consultation.

The special order for 12 o'clock being the report on specialists, it was read by the Secretary, and, on motion of Dr. SAYRE, of New York, the subjoined resolutions of the Committee were adopted and the report referred to the Committee of Publication.

Resolved, That this Association recognizes specialties as proper and legitimate fields of practice.

Resolved, That specialists shall be governed by the same rules of professional etiquette as have been laid down for general practitioners.

Resolved, That it shall not be proper for specialists publicly to advertise themselves as such, or to assume any title not specially granted by a regularly chartered college.

Dr. L. P. YANDELL, Jr., of Kentucky, offered the following, which was adopted:—

Resolved, That private handbills addressed to members of the medical profession, or by cards in medical journals, calling the

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attention of professional brethren to themselves as specialists, be declared in violation of the Code of Ethics of the American Medical Association.

The special order for 1 o'clock being the report on the American Medical Library, Dr. TONER, Chairman, read the report.

After some discussion, on motion of Dr. HIBBERD, of Indiana, the report was accepted.

Dr. DAVIS, of Illinois, offered the following resolutions, which were adopted:—

Resolved, That the proposition of the Librarian of the Congressional Library be accepted.

Resolved, That a committee of one be appointed, residing at Washington, to render the Librarian of Congress such assistance as the interests of the Association may require.

The report on medical education, Dr. J. C. REEVE, of Ohio, Chairman, was presented, and, on motion of Dr. HIBBERD, of Indiana, it was made the special order for 10 o'clock on Thursday.

The Committee on Prize Essays offered the following:—

"The undersigned, appointed Committee on Prize Essays at the session of 1868, respectfully report that they have received but two essays—one upon 'The Physiological Effect and Therapeutical Uses of Atropia and its Salts,' the other upon 'Quinine as a Therapeutic Agent.' They agree to present both of these essays to the Association, and to recommend the award of a prize of one hundred dollars to each of them.

S. M. BEMISS, *Chairman*, JOSEPH T. SCOTT,
C. BEARD, S. A. SMITH."

The Secretary broke the seals, and announced that Dr. S. S. HERRICK, of New Orleans, was the author of the paper on quinine, and Dr. ROBERTS BARTHOLOW, of Cincinnati, was the author of that on atropia.

The report was accepted, and, with the essays, referred to the Committee of Publication.

A paper entitled "Remarks upon Certain Points referring to Success in the Operation of Vesico-Vaginal Fistula" was presented by M. SCHUPPERT, M.D., of New Orleans, La., and referred to the Section on Surgery and Anatomy.

On motion of Dr. DAVIS, the Sections were authorized to meet at 3½ P.M., in place of 3.

A communication from the Gynæcological Society of Boston

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was read by the Permanent Secretary, and, on motion of Dr. DAVIS, was laid upon the table.

Dr. D. W. BOOTH, of Mississippi, offered the following preamble and resolution, which were adopted:—

Whereas, The proper construction of Art. 4, Sec. 1, Code of Ethics, A. M. A., having been called for, relative to consultation with irregular practitioners who are graduates of regular schools:

Resolved, That said Art. 4, Sec. 1, Code of Ethics, A. M. A., excludes all such practitioners from recognition by the regular profession.

On motion, the Association adjourned until Thursday, at 9 A.M.

THIRD DAY.

THURSDAY, MAY 6.

The Association met at 9 A.M., the President in the chair.

Dr. PARVIN, of Indiana, Chairman of the Committee on the President's Address, reported as follows:—

"We cannot refrain, before entering upon the consideration of the plan recommended by the President for the improvement of medical education, from gladly expressing our high appreciation of the general tone of this address, of the broad and catholic spirit which pervades it, finding expression in earnest and eloquent words; in brief, we believe the address worthy the perusal of every member of the profession, in that it was worthy the memorable occasion, and is worthy the annals of medicine.

"On the other hand, we cannot refrain, with sadness be it said, from acknowledging the truth of the terrible allegations made against the present condition of medical education, and the little success attending the efforts for improvements in such connection made during a score of years.

"The special recommendation made by the President is in these words:—

"'I would advise that we appoint a committee of our wisest and best men to digest a plan for one or more national medical schools, and to memorialize Congress in behalf of the enterprise. Let the plan embrace as a basis the features presented by the Cincinnati Convention of Teachers; let these schools or universities confer such distinctions and privileges as will be proportionate to the superiority they demand, and such as will make the attainment of

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their diploma an object of the ambition of those who engage in the study of medicine; let the choice be open to all aspirants, and the appointment or election of professors so guarded as to secure the very highest talent, the most profound learning, with the most fully demonstrated capacity for teaching. Make the salaries of the professors large, and not to depend upon the number of students; and let the Federal Government assume a proper share of the expenses incurred.'

"Your Committee express their hearty approval of this general plan, but suggest that the effort at first should be for the establishment of but a single school, as more feasible; and, besides, one such institution would be a model which other medical colleges might in time be induced to imitate in extent, duration, and thoroughness of teaching, in rigidness of requirements for the degree of M. D.

"We likewise desire to say that, when the details of this general plan are thrown into form, there should be the amplest security against the places and the power of such a medical college as designed ever falling into the hands of politicians or the *protégés* of politicians. Medicine is higher than politics, broader than political creeds and party platforms.

"In conclusion, your Committee reiterate the recommendation of the President as to the appointment of a committee for the special purposes referred to."

On motion of Dr. HIBBERD, the report was adopted, and, on motion of Dr. DAVIS, the committee was ordered to consist of five.

The President appointed Drs. F. G. SMITH, of Pennsylvania, D. H. STORER, of Massachusetts, E. S. GAILLARD, of Kentucky, and JOSEPH JONES, of Louisiana.

On motion of Dr. DAVIS, of Illinois, the President, Dr. W. O. BALDWIN, was added to the committee.

Dr. PALMER, of Michigan, submitted the following amendments to the By-Laws, which were adopted:—

Amend Art. II. of the By-Laws by inserting in place of the clause after "each section shall choose, etc.," these words: "The chairman and secretary of the several sections shall, like other officers of the Association, be nominated by the special committee of one member from each State represented at the meeting, and elected by a vote on general ticket. They shall hold their office until the close of the proper business of the annual meeting next succeeding their election, and until their successors are appointed."

Modify the next paragraph thus: "Papers appropriate to the

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several sections, in order to secure consideration and action, must be sent to the secretary of the appropriate section at least one month before the meeting which is to act upon them. It shall be the duty of the secretary to whom such papers are sent to examine them with care, and, with the advice of the chairman of his section, to determine the time and order of their presentation, and give due notice of the same; and, after their full examination and discussion by the section, they shall be sent to the Permanent Secretary of the Association.

"All papers presented directly to the Association, and other matters, may, at the discretion of the Association, be referred to the various sections for their consideration and report."

The President appointed as delegates to the British Medical Association the following gentlemen: Drs. NINIAN PINCKNEY, of the U. S. Navy; R. R. MCILVAINE, of Ohio; J. F. HIBBERD, of Indiana; HARVEY LINDSLEY, of the District of Columbia; and G. C. BLACKMAN, of Ohio. To the Canadian Medical Association: Dr. ALDEN MARCH, of New York.

He also appointed as the Committee on Ethics, Drs. L. A. SAYRE, of New York; J. M. TONER, of the District of Columbia; H. F. ASKEW, of Delaware; R. D. ARNOLD, of Georgia; and L. A. MCCLUSKEY, of Alabama.

Dr. HIBBERD presented a handbill put out by Dr. J. B. BUCHTIL, of Terre Haute, Indiana, and charged irregular practice in this conduct. The paper was read, and referred to the Committee on Ethics.

Dr. DAVIS presented the following from the Association of American Medical Editors:—

"*To the American Medical Association:*

"I have been instructed to announce to your honorable body that those members of your Association in attendance on this annual meeting who are editors of medical journals, after proper consultation, have effected a permanent organization, with the title of 'The Association of American Medical Editors.' The objects of this organization are the cultivation of friendly relations, mutual assistance, community of effort and views, where possible, in the system of receiving foreign exchanges and sending our own journals abroad; concert of action in support of improvements in the present system of medical education, and of a higher standard of preliminary attainments for those who propose to enter upon the study of

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medicine; in proposing laws for the proper registration of births, marriages, and deaths; in collecting the names of all the regular practitioners in the several States; and in promoting generally the value and efficiency of our periodical medical literature. The Association thus formed is to hold its annual sessions on the day preceding the annual meetings of this body, and in the same localities. Dr. W. S. MITCHELL, of New Orleans, La., is the Permanent Secretary, and Dr. J. B. LINDSLEY, of Nashville, Tenn., the Assistant Secretary. Congratulating your honorable body on the establishment of another organized power within the ranks of your noble profession, I remain Yours, most truly,

N. S. DAVIS, *Editor*,
President of the Association of American Medical Editors."

It was, on motion, referred to the Committee of Publication.

The Secretary presented a paper from Dr. WALSH, of Georgia, referring to the action of the Georgia Medical Society in his case. It was, on motion, referred to the Committee on Ethics.

Dr. PARVIN, of Indiana, read the report of Dr. J. C. REEVES, of Ohio, on medical education, which had been made the special order for 10 o'clock A.M. The report was adopted, and referred to the Committee of Publication.

Dr. J. J. WOODWARD, of the U. S. Army, Chairman of the Committee on Nominations, reported the following:—

OFFICERS FOR 1870.

PRESIDENT.

GEORGE MENDENHALL, *of Ohio.*

VICE-PRESIDENTS.

WARREN STONE, *of Louisiana.*
LOUIS A. SAYRE, *of New York.*
F. GURNEY SMITH, *of Pennsylvania.*
JOHN S. MOORE, *of Missouri.*

ASSISTANT SECRETARY.

WM. LEE, *of the District of Columbia.*

TREASURER.

CASPAR WISTER, *of Pennsylvania.*

LIBRARIAN.

ROBERT REYBURN, *of the District of Columbia.*

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Committee of Arrangements.—THOMAS ANTISELL, Chairman, ROBERT REYBURN, C. M. FORD, L. W. RITCHIE, W. J. C. DUHAMEL, D. R. HAGNER, and C. F. NALLY, all of the District of Columbia.

Committee of Publication.—F. GURNEY SMITH, of Pennsylvania, Chairman; W. B. ATKINSON, of Pennsylvania; A. J. SEMMES, of Georgia; ROBERT REYBURN, of the District of Columbia; CASPAR WISTER, of Pennsylvania; H. F. ASKEW, of Delaware; and WM. MAYBURRY, of Pennsylvania.

Committee on Medical Literature.—J. J. WOODWARD, of the U. S. Army, Chairman; W. H. ANDERSON, of Alabama; THEOPHILUS PARVIN, of Indiana; HOSMER A. JOHNSON, of Illinois; and C. W. PARSONS, of Rhode Island.

Committee on Prize Essays.—GRAFTON TYLER, of the District of Columbia, Chairman; N. S. LINCOLN, of the District of Columbia; N. R. SMITH, G. W. MILTENBERGER, and J. W. R. DUNBAR, of Maryland.

Committee on Education.—T. G. RICHARDSON, of Louisiana, Chairman; E. W. JENCKS, of Michigan; E. S. GAILLARD, of Kentucky; and W. M. MCPHEETERS, of Missouri.

Committee on Epidemics.—Add the following, to fill vacancies: J. K. BARTLETT, of Wisconsin, and J. D. JACKSON, of Kentucky.

Time for meeting, in Washington, first Tuesday in May, 1870.

The report was unanimously adopted.

Dr. HERRICK, of Louisiana, offered the following amendment to the Code of Ethics on the duties of physicians to each other and the profession at large, Art. 1:—

"SEC. 5. The spirit of trade and of gain from merchandise should by all means be dissociated from the practice of a liberal profession, and it is important that practitioners should not allow their pecuniary interests to compromise their duties to their patients. Therefore, in cities and other communities where the services of competent apothecaries can conveniently be obtained, physicians should resign to them the whole business and profits of dispensing medicines."

Laid over to the next yearly session.

Dr. DAVIS, Chairman of the Committee on Various Propositions and Communications from Medical Societies, etc., offered the following report. The resolutions were adopted and referred to the Committee of Publication.

"After a fair examination of the various propositions concerning medical education, medical legislation, and ethical regulations for

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medical colleges, referred to your Committee, we respectfully submit the following report:—

"*Whereas*, The results of all the efforts made during the last twenty-five years to elevate the standard of medical education, through concert of action among the numerous medical colleges of this country, have proved with equal clearness that such concert of action in an efficient manner is unattainable; therefore,

"*Resolved*, That whatever is done to establish and maintain a just and fair standard of medical education throughout our whole country must be done by the profession itself, through its own voluntary organizations, in the same manner that it now establishes and enforces its Code of Ethics. The profession is as competent to declare, through its representatives in the national, State, and local societies, what shall be the standard of attainments for those to be recognized and admitted into its ranks, and to establish the boards or agencies by which compliance with such standard shall be ascertained, as it is to declare what shall be the ethical rules governing the conduct of those already admitted.

"*Resolved*, That this Association earnestly requests each State medical society to appoint annually one or more boards of examiners, composed of five thoroughly qualified members, whose duty it shall be to meet at suitable times and places for the examination of all persons, whether graduates of colleges or not, who propose to enter upon the practice of medicine in their respective States, except such as have been previously examined and licensed by a similar board in some other State.

"*Resolved*, That each State medical society be requested to make such regulations concerning the pay of the boards of examiners, and the fee to be charged for a license to practise, that the former shall in no case depend on the amount received from the latter.

"*Resolved*, That each State medical society be requested to require its examining board or boards to exact of every applicant for examination adequate proof that he has a proper general education, is twenty-one years of age, and has pursued the study of medicine three full years, one year of which time shall have been in some regularly organized medical college, whose curriculum embraces adequate facilities for didactic, demonstrative, and hospital clinical instruction.

"*Resolved*, That each State medical society be requested to act on the foregoing propositions at the next regular annual meeting after the reception of copies of the same, and, if approved and

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adopted by the State medical societies of two-thirds of the States, this Association shall deny representation from all organizations who longer refuse to comply with the same, and shall recommend the State societies to do the same; and all persons who after that date seek to enter upon the practice of medicine without first receiving a license from some State board of examiners, shall be treated ethically as irregular practitioners.

"*Resolved*, That in adopting the foregoing resolutions, by which it is proposed to treat the medical college diploma the same as the diploma of any literary college, this Association is actuated by no desire to injure the medical schools of our country. On the contrary, by the adoption of the fourth resolution, at the same time that the value of the mere college diploma is practically nullified, it is the desire and confident expectation that those institutions will be greatly benefited, because they will be forced to rival each other in the extent and efficiency of their courses of instruction, instead of the number of diplomas which they can annually distribute.

"All of which is respectfully submitted,

N. S. DAVIS,
PAUL F. EVE,
E. S. GAILLARD,
E. LEE JONES,
J. K. BARTLETT."

On motion of Dr. DAVIS, it was

Resolved, That a special committee of three be appointed by the President, to present copies of the resolutions adopted, before the several State medical societies at as early a period as possible.

Committee: Drs. DAVIS, of Illinois, J. S. WEATHERLY, of Alabama, and J. M. TONER, of the District of Columbia.

Dr. CHAILLE, of Louisiana, presented the following report on medical nomenclature, which was received and adopted, and referred to the Committee of Publication:—

"The Committee on the Nomenclature of Diseases has the honor to report that it has examined the 'Provisional Nomenclature of the Royal College of Physicians' of London, and is of the opinion that it is desirable for this Association to recommend and adopt the same for general use in this country, with such modifications as, on deliberate consideration, may appear to be necessary. The following resolutions are therefore submitted:—

"1. *Resolved*, That a special committee of fifteen be appointed by the President to take this subject into deliberate consideration,

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and to report at the next annual session what alterations, if any, are necessary to adapt the proposed nomenclature to general use in the United States.

"2. That this committee be authorized to fill up any vacancies which may occur upon it.

"3. That the Committee of Publication be authorized to publish, for general distribution, one thousand copies of the English and Latin portions of this nomenclature, under the designation of the Proposed Nomenclature, prefacing the same with such remarks as may be deemed necessary to secure the criticism and co-operation of as large a number of American medical men as practicable.

"4. That the committee hereby appointed be directed to draw the attention of the Surgeon-General of the Army, of the Chief of the Bureau of Medicine and Surgery of the Navy, and of the Superintendent of the Census to the question of their official adoption of the proposed nomenclature; to invite them to appoint whom they see fit to represent them on this committee; and to solicit such co-operation as may be necessary to accomplish the purpose desired, viz., the final adoption of such nomenclature and classification as will receive the conjoint approval of the official medical bureaux of the government and of the general profession."

In accordance with the above, the following committee of fifteen was appointed:—

FRANCIS G. SMITH, of Pennsylvania, Chairman; J. J. WOODWARD, of the U. S. Army; R. F. MICHEL, of Alabama; A. B. PALMER, of Michigan; S. E. CHAILLE, of Louisiana; L. P. YANDELL, Jr., of Kentucky; AUSTIN FLINT, of New York; ALONZO CLARK, of New York; GEO. B. WOOD, of Pennsylvania; S. H. DICKSON, of Pennsylvania; E. JARVIS, of Massachusetts; T. PARVIN, of Indiana; W. M. MCPHEETERS, of Missouri; E. M. SNOW, of Rhode Island; and N. PINCKNEY, of the U. S. Navy.

Capt. NEAL, of the steamer Richmond, invited the members to take an excursion at 5 P. M.

On motion of Dr. J. P. GARRISH, of New York, the invitation was accepted, and a vote of thanks was tendered to Capt. NEAL.

On motion of Dr. GARRISH, of New York, a vote of thanks was also offered to the New Orleans, Jackson, and Great Northern Railroad, for its agreement to pass members back free, and to the Morgan line of steamers and the Mobile and Ohio Railroad, for their courtesy in tendering free passes to delegates and members who return homeward by those lines.

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Dr. GAILLARD, of Kentucky, offered the following, after some preliminary remarks:—

Resolved, That the adoption of a uniform rate of collegiate fees—$120 being the minimum—be accepted as the sentiment and desire of this Association.

Dr. LOGAN, of Alabama, moved to amend by inserting $140.

After considerable discussion, the resolution was adopted as read.

Dr. WOODWARD proposed as a special committee on the relative advantages of Syme's and Pirogoff's mode of amputating at the ankle, Drs. G. A. OTIS, of the U. S. Army (Chairman), and J. D. HOLLOWAY, of Louisville, Ky.

Dr. BEMISS proposed Dr. JOHN WATERS, of St. Louis, Mo., as a special committee on the doctrine of force, physical and vital.

Dr. A. M. POLLOCK, of Pennsylvania, presented the following as an amendment to the Constitution:—

Resolved, That all county medical societies shall be required to elect a committee annually whose duty it shall be to examine all applicants for admission as students under the tuition of its members, and that no member of any county medical society shall receive any such applicant until such applicant shall present a certificate from said committee, testifying that he has a good English education, and a sufficient knowledge of Greek and Latin to enable him to pursue his studies with advantage.

Laid over, under the rules.

On motion of Dr. TONER, of the District of Columbia, a Committee on Variola was appointed, with Dr. JOSEPH JONES, of Louisiana, as Chairman.

Dr. PINCKNEY, of the U. S. Navy, made a statement respecting relative grades of rank, which was ordered to be spread on the minutes:—

"*Gentlemen of the American Medical Association:*

"I have no special report to present to your honorable body, but I would crave your indulgence while I read to you a brief statement prepared on the instant.

"It has been my pride and pleasure on many occasions to appear before you as a delegate on behalf of the navy of the United States. I am again by your council board, to refresh myself at the fountain which at the touch of our noble profession gives forth the waters of refreshment.

"The subject of the medical staff rank was brought to your

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notice in 1848, when, for the first time, it was my privilege to join in your deliberations. From that period to the present, your influence has been asked and most cordially and persistently given. In 1846, relative staff rank was established by the Department, and in 1854, Congress gave to it the full force and effect of law. The highest rank then conferred was that of commander. In 1863, the relative rank of commodore and captain was established by Department regulation.

"The Hon. Senator, Mr. Grimes, reported a bill for the reorganization of the navy, which passed the Senate with singular unanimity. This bill created two higher grades. There were objectionable features in it, so far as the staff corps were concerned. The most objectionable was the term 'junior to that grade.' When the bill was before the Naval Committee of the House, I had an interview with Vice-Admiral Porter, and pointed out to him the ground of objection to this bill. He at once expressed his willingness to have it stricken out, and authorized me to say so to the Chairman of the Naval Committee. I did so. Admiral Porter subsequently wrote a letter making this suggestion, which was transmitted by me to the Hon. Mr. Scofield.

"There has been a great deal written touching this bill, so far as it related to the staff. While I admit that it was not all that I desired, I still considered the establishing of two higher grades, and incorporation in it of the suggestion of Admiral Porter, a decided gain, and advocated its passage. I was satisfied that it was an impossibility to so frame a law as to give entire satisfaction to all. Such a feat never has been and never will be accomplished. I am no Utopian dreamer. It is only by mutual conciliation, in a true spirit of compromise, that conflicting interests can be harmonized.

"A mere regulation of the department, establishing higher grades of relative rank, is of no binding effect without the sanction of Congress. If one Secretary could by regulation establish so important a principle, another could as easily revoke it. This led me to seek, with others, to obtain the sanction of Congress. A right so sacred and important as that of rank should be settled and established by law, and not left to the caprice of any one man, however wise or just. I considered then, as I consider now, that the bill of Mr. Grimes, with the suggestion of Admiral Porter, was as good a bill to start with as we could obtain, and I, for one, was not prepared to oppose its passage in the House because it did not secure to us

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all we wished. So far as Admiral Porter is concerned, I know and am proud to say that the medical corps has no truer friend than he. Bold as he is in spirit, jealous as he is of the just fame and rights of the line, he appreciates what is due to us. The medical corps were never placed on a firmer basis than at the present moment, and I have full confidence that all proper rank will be speedily accorded to it by the next Congress. Admiral Porter will do what he thinks right, and nothing will deter him. He never forgets the claims of justice, nor cowers before opposition when justice hangs in the balances. I make this public declaration because it is due to him and to ourselves.

"Thanking you for your past aid and encouragement, and feeling always sure of your sympathy and support, I am proud of the privilege of submitting to you this brief statement.

"It does not seem to be just that I should close this statement without according to the Hon. Wm. Grimes the honor due to him, by bearing my humble testimony to his devotion to the navy, and rare familiarity with all that affects either its character, usefulness, or efficiency."

On motion, the Association adjourned, to meet at 9 o'clock A.M., Friday, May 7.

FOURTH DAY.

FRIDAY, MAY 7.

The Association met at 9 o'clock, the President, Dr. BALDWIN, in the chair.

Dr. JOSEPH JONES, of Louisiana, presented a number of specimens of pathology, anatomy and natural history. The explanations were very interesting, and elicited highly complimentary remarks.

On motion of Dr. GARRISH, of New York, the thanks of the Association were tendered to Dr. JONES.

The President appointed as additional delegates to the Canadian Medical Association: Drs. H. F. ASKEW, of Delaware; R. MILLER, of Alabama; J. M. BUSH, of Kentucky; N. S. DAVIS, of Illinois; B. H. BIGGS, of Alabama; and J. P. GARRISH, of New York.

To the International Medical Association: Drs. W. J. C. DUHAMEL, of the District of Columbia; JOS. BERNEY, of Alabama; E. L. JONES, of New York; B. F. DAWSON, of New York; JOS. JONES, of Louisiana; and G. C. BLACKMAN, of Ohio.

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To the British Medical Congress: Drs. F. A. Ross, of Alabama, and DONALD MACLEAN, of Kentucky.

Delegate to the Association of Superintendents of Insane Asylums: Dr. ROBERT REYBURN, of the District of Columbia.

On motion, Dr. JOS. JONES, of Louisiana, was added to the Committee on the Establishment of a National Medical College.

On motion of Dr. F. G. SMITH, of Pennsylvania, the following resolutions were unanimously adopted by a vote of the members present, standing, as a mark of respect:—

Resolved, That the thanks of this Association are justly due and are hereby tendered to the President, for the uniform kindness and courtesy with which he has presided over the deliberations, and to the Committee of Arrangements, the physicians and citizens of New Orleans, for the generous hospitality and fraternal kindness with which we have been received and treated during our sojourn in their city, with the assurance that the memories of this visit will always be among the brightest and most endearing of our lives.

Resolved, That we also present our thanks to the various railroad and steamboat companies who have so liberally extended to us facilities of transportation, and to the daily press for their efficient aid in reporting the proceedings of this meeting.

On motion of Dr. J. S. MOORE, of Mississippi, the following preamble and resolution were adopted:—

Whereas, The contract system is contrary to medical ethics:

Resolved, That all contract physicians, as well as those guilty of bidding for practice at less rates than those established by a majority of regular graduates of the same locality, be classed as irregular practitioners.

The Section on Meteorology, Medical Topography, and Epidemics reported their minutes, which were read and referred to the Committee of Publication.

The Section on Practical Medicine and Obstetrics reported their minutes, which were also referred to the Committee of Publication.

On motion, the resolution appended to the paper on training of nurses was adopted.

Resolved, That a copy of this report, authenticated by the signatures of the President and Secretary of this Association, be sent to the State Medical Societies of the different States of the Union, inviting their co-operation in the establishment of schools for the training of nurses for hospitals and private families, in accordance with the principles therein advocated.

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The Section on Medical Jurisprudence, Hygiene, and Physiology reported their minutes, which were referred to the Committee of Publication.

The Section on Surgery reported their minutes, which were read and similarly referred.

As the Section on Psychology had not organized, on motion, the report of the delegate to the Association of Superintendents of Insane Asylums, which had been referred to it, was referred to the Committee of Publication, with instructions to publish only that portion which had not previously appeared in any publication.

The President appointed Dr. J. M. TONER the special committee of one, at Washington, D. C., to assist the Librarian of Congress to keep the books of the Association.

On motion of Dr. TONER, of the District of Columbia, a paper offered at the last session by Dr. JOSEPH JONES, of Louisiana, on albinism, etc., was referred to the Committee of Publication.

On a motion for adjournment, the President delivered the following address, which was unanimously ordered to be published in the minutes of the Association:—

"GENTLEMEN: Before I submit the motion just made, and which, when adopted, will practically close my official relations to this body, allow me to return you my most cordial and grateful thanks for the unvarying kindness which I have received at your hands. Whatever my future lot in life may be, the world holds no honors which to me can equal those conferred by you. The fraternal good-will which has so conspicuously marked your deliberations has been to me a matter of infinite satisfaction and pride, and will not be the least among the grateful memories which will gladden my heart as I may hereafter review the incidents of my official connection with you.

"To win your judgment and approval, to hold up the dignity of fellowship, the usefulness of association, and the interest and prosperity of the profession at large, have certainly occupied my most anxious thoughts since my elevation to this position; yet to cherish and promote the intimate and cordial relations of friendship between the individual members of this Association against all sectional distinctions or geographical lines has also been among the chief objects of my ambition and the earnest desires of my heart. Could I now believe that my efforts have contributed in the slightest degree to enlarging that harmony of sentiment and fraternal feeling which has been so apparent throughout this meeting, I should feel

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that I had commenced at least to make some return for the great honor and kindness received at your hands.

"It now only remains for me, gentlemen, to again express to you my thanks, to wish you a safe return to your homes and labors, a happy reunion with your friends and families, and to pronounce that sad word, over which the heart of friendship would fain linger, as I bid you an affectionate farewell."

The Association then adjourned, to meet in Washington, D. C., on the first Tuesday in May, 1870.

WM. B. ATKINSON,
Permanent Secretary.

A. J. SEMMES,
Assistant Secretary.

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REPORT

OF

THE COMMITTEE OF PUBLICATION

AND OF

THE TREASURER.

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REPORT OF THE COMMITTEE OF PUBLICATION.

THE Committee of Publication respectfully report that an edition of six hundred and fifty copies of Vol. XIX. of the *Transactions* has been issued since the last meeting of the Association, at an aggregate expense of $2203.98, the items of which are given in the report of the Treasurer.

The following schedule exhibits the number of copies of each volume now on hand, and those sold since the last meeting:—

Statement of Volumes delivered, April 20, 1868, *to April* 15, 1869.

	On hand April 20, 1868.	Since delivered.	On hand April 15, 1869.
Volume I.	7	..	7
" II.	7	1	6
" III.	5	2	3
" IV.	4	..	4
" V.	198	2	196
" VI.	4	..	4
" VII.	10	2	8
" VIII.	162	3	159
" IX.	192	2	190
" X.	104	4	100
" XI.	121	3	118
" XII.	199	3	196
" XIII.	80	2	78
" XIV.	142	5	137
" XV.	137	6	131
" XVI.	303	9	294
" XVII.	99	16	83
" XVIII.	105	50	55
" XIX.[1]	650	584[2]	66
Proceedings	18	2	16

[1] Published October 20, 1868.

[2] Of these, 25 were delivered to medical journals.

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The experience of the last year once more confirms the wisdom of intrusting the examination of the proofs exclusively to the Committee of Publication, inasmuch as Vol. XIX. of the *Transactions*—the copy of which was put into the printer's hands about the first of last June—was ready for delivery on the 25th of September of the same year. The volume could have been finished considerably earlier, had it not seemed desirable, for reasons which it is scarcely necessary to state, that the proofs of certain diagrams and illustrations should be submitted to the authors for examination and revision. With the exception of such papers as contained illustrations, the proofs were read by the Committee of Publication alone.

The Committee would again suggest to authors the lasting importance of preparing their papers with the utmost care, in order that the task of revision on the part of the Committee may be attended with little labor beyond the simple superintendence of the press. The Committee add their congratulations to those of the Treasurer on the extinction of the indebtedness of the Association, and recommend that a circular similar to that issued last year be again distributed to the members.

All of which is respectfully submitted.

FRANCIS G. SMITH, JR.,
Chairman.

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REPORT OF THE TREASURER.

THE Treasurer has the honor to report that under the operation of the recent law, obliging permanent members to subscribe to the yearly *Transactions*, or else suffer the removal of their names from the list of permanent members, the Association has been able to publish its volume of *Transactions*, pay all its debts, and have a surplus towards the expenses of the next year.

Contrast this with the former humiliating condition when the volume was published on credit, and the Association, after beseeching subscription to the *Transactions* among its permanent members, was forced to appear at the annual meeting in debt to its printer, and then owe the payment of the debt to the voluntary subscription of a few zealous delegates.

Again, the Committee on Prize Essays has exercised more scrutiny, and, instead of voting two hundred dollars yearly as a matter of course to the two best essays presented, gives now no prize unless there is an essay offered of great intrinsic merit, as was the intention in the original offer of a gratuity.

The Treasurer hopes that the Association will adhere to these wise resolves, which experience has shown to be absolutely necessary to the yearly publication of a volume of *Transactions*, as the funds received from delegates never furnish a sufficient sum, and the voluntary subscription of permanent members has degenerated into comparative insignificance.

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The American Medical Association

DR.

May 1, 1868.		
To cash balance on hand		$83 92
" from delegates at Washington		1615 00
" from permanent members		1510 00
" from discount on bills paid		110 00
		$3318 92
May 1, 1869.		
To balance on hand		$976 08

CASPAR WISTER, *Treasurer.*

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in account with Dr. Caspar Wister, Treasurer.

Cr.

May 1, 1869.		
By cash, discount on draft		$2 00
"	Henry Barnes, for services as clerk . .	50 00
"	T. K. Collins, for printing, binding, illustrations, circulars, and postage for 650 copies of *Transactions*, Vol. XIX. . . .	2203 98
"	Dr. W. B. Atkinson, for travelling expenses and postage	57 63
"	H. C. Lea, for cash paid freight, postage, and expenses of delivery of Vol. XIX. . .	29 23
"	Balance	976 08
		$3318 92

Audited and found correct.

F. G. SMITH,
Chairman Com. Pub.
H. F. ASKEW,
WM. MAYBURRY,
W. B. ATKINSON.

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ADDRESS

OF

WILLIAM O. BALDWIN, M.D.,

PRESIDENT OF THE ASSOCIATION.

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ADDRESS OF WILLIAM O. BALDWIN, M.D.,

PRESIDENT OF THE ASSOCIATION.

GENTLEMEN OF THE AMERICAN MEDICAL ASSOCIATION:

I congratulate you on the return of an occasion which permits us to renew that fraternity of intellect, no less than that sympathy of feeling, by which our life and vocation as physicians are beautified and ennobled. Of no profession are the inspired words more true than of ours, that we are "members one of another." The ideal of our profession is that of complete and thorough oneness. What is scientific truth for one is scientific truth for all. We have a common estate in the facts, aims, and purposes that belong to the science of medicine; and hence we do a wise work when we acknowledge the exalted unity of the medical profession by this annual assemblage.

The nature of this occasion reconciles me in some degree to the task which I have now to perform. When I remember that the position I occupy was first filled by the distinguished Chapman, and that the succeeding anniversaries have been presided over by men whose genius had shed not only light but lustre on the annals of our profession, I feel that nothing but the inspiration which breathes through affections kindled into life by this Association could sustain me under the sense of incompetency for the duties to which your kindness has called me. Relying on the same spirit which prompted you to confer on me the highest distinction within the gift of the medical profession of America, and hoping that my deficiencies may be forgotten in the interest and magnitude of the subjects awaiting your deliberation, I proceed to discharge the duty which the custom of my predecessors has imposed upon your presiding officer.

The spirit of a profession is the true sign of its character, as it is the measure of that respect with which its talents and services

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are regarded. Manly sentiment springing from broad and genial sympathies is the soul of every profession; and if it is wanting, no learning, no skill, not even usefulness, can prevent it from sure and speedy degradation. The first and last requisite of professional life is not power of intellect, however valuable that may be, nor those acquisitions of knowledge that enrich our thoughts, but that other and finer quality of generous manhood which, as a subtle and pervading essence, enters with its healthy vigor and animating impulse into all its connections. Of our profession this is eminently true; and on this account I rejoice that the records of this Association give no evidence of sectional unkindness and prejudice even during the period of our bloody war.

To me, gentlemen, this occasion is one of solemnity and significance. Standing here in the great commercial metropolis of the South, I find myself surrounded by men representing nearly every section of a country so lately arrayed in hostile strife. At a time when every other organization has been shaken to its centre by the passions of deadliest hate; at a time when the most matured conservatism has been overmastered by the vindictive fury which has swayed the popular mind; at a time when even instinct has been treacherous to its ends—you have been drawn hither from homes far distant, over highways full of painful historic incidents, through territories watered by the blood and tears of a sorrowing nation; and you have assembled here as brothers and friends, to unite your offerings to a common science. The mournful witnesses of this terrific struggle have confronted your eyes; the shadowy phantoms still linger on the stage where these tragedies have been performed; the air we breathe has not yet lost its echoing groans of dying heroism, nor the pathetic anguish of sorrowing relations. Amid these circumstances, so sundering to the most sacred companionships of life, you have met in the spirit of Him who is this world's greatest and best healer—that Divine One who, opening and continuing his ministry of service by curing all manner of diseases, finished its majestic self-denials in the reconciliations of the cross.

Eight years ago we were separated by civil war. That war engendered the bitterest feeling in every other national organization, whether scientific, political, or Christian; but the members of this Association, without words of crimination or reproach for one another, assumed the respective places assigned them by the obligations of citizenship. Through the long and bloody contest

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which ensued, this Association, in its resources, honor, and renown, was in the keeping of our Northern brethren; and during those memorable years when the sense of bitter wrong and burning hate filled all hearts, and when friendships and affections born of the hallowed ties of consanguinity sent their messages—once of love and tenderness—at the point of the bayonet or through the cannon's mouth, what were the feelings which moved this Association? At the first meeting, two years after the war began, they indulged only in expressions of profound regret that "the brethren who once knelt with them at the same holy altar, and drank with them at the same pure fountain,"[1] had been separated from them by civil war, endangering thereby the claims of the Association "to an unselfish nationality, and robbing it of the presence and the counsel of many of its warmest adherents,"[2] while praying, at the following meeting, that the period would soon come when we should again be "one in our political, professional, and social relations."[3]

The same humane and catholic spirit continued during the war to mark the conduct of the members of this Association. Each of the divided sections met the tasks required by its respective position. But wherever found, whether sharing the hardships of the campaign or discharging the duties of private practice, they comprehended the essential difference between what might prove on the one hand a transitory evil, and what, on the other hand, they knew would be a lasting good. Accordingly they remained the consistent representatives of a noble brotherhood. If they did not sink the patriot in the physician, they did not sink the physician in the patriot. The imperative instincts of each character, true to its trusts and faithful to its requirements, acted for themselves and in the direction of their own ends. Amid the shouts of battle and the shock of arms they raised themselves to the height and grandeur of their calling, and thus stood far above the embittered prejudices that encircled all other classes of men. So far from allowing the fugitive passions of the times to betray them from their professional allegiance, they vindicated their sagacity no less than their manliness by looking to the future; by contemplating results not the less certain because remote; by regarding with thoughts chastened and subdued that state of man in which the interests of life and death meet together; and by considering as paramount to all selfish motives the claims of that science with

[1] Transactions, 1863. [2] Ibid. [3] Transactions, 1864.

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whose undisclosed mysteries they must yet wrestle for the well-being of mankind. Above all, they looked to the transcendent value of a virtue which should contrast in broad masses of light its purity and power with the corruptions and frailties of the hour; which should, by reason of its disinterestedness, diffuse itself through the affections of nations, and reach, in the large outgoings of its sympathy, the hearts of generations yet unborn.

When at last this dispensation of carnage ended, and whilst as yet the war-path was crimsoned with the blood or whitened with the unburied bones of our brethren, this Association again met. Like the surges of the sea, dark, tumultuous, raging, though the storm has passed from the sky and fled beyond the horizon, the meaner instincts of hatred, revenge, and persecution still swayed the multitude. The mob of fanatical intellect unappeased, and the mob of popular passions thirsting for new strife, joined their hands to prolong the wretched alienation. The avenging angel had lifted his brooding wings from the landscape, and cried, "It is enough;" but now other vials of wrath seemed to be about poured forth on a land hopeless because helpless. You then met to pour oil on the unquiet waters. Here was scope for a statesmanship, ay, for a generalship, grander than any which the war had developed. Here was the best of opportunities to inaugurate a new epoch of fraternal sympathy. Nor were you unmindful of its solemn behests. True to your past professions of regret over our separation, you saw the vacant seats in this Association of your Southern brethren, and, actuated by the higher instincts of manhood, and scorning the base ambition to degrade a fallen antagonist, whom the saddest experience had taught the bitterest lessons of life, you set the nation an example of dignity, moderation, and virtue to which no other organization in the land has yet had the wisdom or the sensibility to rise.

Within a few weeks after the cessation of hostilities this Association held its regular annual meeting in the city of Boston, and there renewed with manly sympathy its former expressions of kindness, inviting us to come again and be their brethren. I quote their own language on that occasion when I say "the unhappy feud which for years has divided the nation has ceased, and peace has come, we trust, forever; so we hope soon again to meet our members and delegates from the South on the platform of fraternization, and to this end we extend to them a cordial welcome."[1]

[1] Resolution introduced by Dr. J. R. Van Kleek, of New York, and adopted. Transactions for 1865, vol. xvi. p. 57.

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At a subsequent meeting you repeated this sentiment in the following language: "We would fain meet again those from whom we have been separated, draw the mantle of forgetfulness over the past, renew to them the expressions of regard, and with them dedicate the hour and the occasion to the sacred cause of learning, friendship, and truth."[1] And when at the last meeting we met our Northern brethren, how were we received? They met us as equals in the past and equals in the present, saying, in effect, if not in words, "If quarrel we ever had, it is over; we have no explanations to offer, no apologies to demand; we know that we have done our duty; we feel that you have done no more, and that you would have been unworthy your noble vocation had you done less; we have guarded faithfully the institution so long left in our charge, in which we now claim but an equal interest with you; with the incense which we have burned in its sacred fane we have not permitted the poisonous spirit of party to mingle, and we now invite you to go with us to the smiling and peaceful fields of that science whose interests it shall be our common work to foster and advance; here we will walk with you to the stern realities and moveless grandeur of labor and thought, and find in their quiet paths a relief from the gloom of the past; here we will divide with you the toils and share with you the rewards of labor, the honors of success." Against the insolence of the day, against its unreasoning pride, its overweening vanity, and its shameless scorns, your conduct bore a moral protest, which, while acting directly on our profession, has had no small agency in producing those indications of a return to reciprocal sentiments of confidence and respect in which all the good men of the country rejoice. The mythical war between the Athenians and Amazons led in the midst of arms to the most intimate friendship between their leaders. When Pirithous and Theseus finally met on the Plains of Marathon after many a hard-fought battle, the former, regarding himself and army as captives, said to the latter, "Be judge thyself; what satisfaction dost thou require?" The noble Athenian replied, "Thy friendship;" and they swore inviolable fidelity, and were ever after true brothers in arms. Alas, that the nineteenth century has so often to recur to classical heathenism to find its illustrations of genuine magnanimity!

[1] Address of the Committee of Arrangements, through their chairman, Dr. C. C. Cox. Transactions for 1866, vol. xvii. p. 10.

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Looking at these facts, am I not warranted in asking if any organization has emerged from our late convulsions with so much dignity. Has it not come forth from the sharp ordeal with those graceful virtues that belong to our higher nature? The world may have its conventional rules of intercourse between man and man, its creed of moral philosophy, its code of honor, its accredited formula of behavior, while it lavishes its praise on the charms of human brotherhood, but it has been left to the American Medical Association to teach practically the intellects of the land one of the most ennobling lessons in the dignity, beauty, and glory of refined and civilized life—a lesson that not only hallows the spirit of our professional character, but instructs the physician in those spiritual sentiments which lead to the highest virtues, among which are reckoned charity and forgiveness. Of the one we are told that the archangel, who never knew the feeling of hatred, has reason to envy the man who subdues it; while of the other it is said that when we practise forgiveness to the man who has pierced our heart, he stands to us in the relation of the sea-worm that perforates the shell of the mussel, which straightway closes the wound with a pearl.

No apology, gentlemen, is necessary for dwelling so long on the moral spirit of this Association. If I had not believed that a moral sentiment underlies all profound thought, all true research, all genuine wisdom; that it is the strength of civilization, the security against those covert forms of heathenishness and brutality that lurk under the imposing hypocrisies of outward splendor, and the ulterior end for which nations and mankind exist; if I had not been assured that our profession rests on this basis, and can rest on no other, I should not have devoted so much time to this subject. Turning from these reflections, so naturally suggested by the circumstances of our present meeting, I am reminded that other points of great practical significance claim our attention.

I must in advance, gentlemen, beg your indulgence, as the scope of my remarks will, I fear, consume more time than is usual on such occasions.

I almost fear to name to you, gentlemen, the subject I have chosen for a few remarks. So frequently has it been the theme of discussion, that some may be wearied by its repetition. I approach it, too, with much diffidence, because it has been handled by so many abler minds. I allude to the subject of MEDICAL EDUCATION.

If it is an old topic, and, moreover, somewhat worn, it has the

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advantage of a deep, vital, and permanent interest, from which the want of novelty cannot detract. Furthermore, it is a topic that has recently assumed new aspects. Vast changes have lately occurred, not only in human progress, but in the specific direction which that progress has assumed. Physical science is achieving unprecedented results. The mind of man, liberated from its long but salutary apprenticeship to the external phenomena of the universe, seems to be approaching its maturation by penetrating into the secrets of matter, evoking its mightiest forces, and subordinating them to the advance of civilization. In all departments of practical science we see a resoluteness of investigation, a constancy of indomitable will, a scope of rational inquiry, that are remarkable. The breadth of this movement embraces all the divisions of human knowledge, and its characteristic features are thoroughness and completeness. If the chemist, the engineer, the natural philosopher have to adjust themselves to these extraordinary changes; if the inter-relations of the sciences and arts are constantly acting to impel each one of these sciences and arts to wider researches and a fuller mastery of its own legitimate facts, it cannot be expected that medical education will fail to feel the impulses of the age. A profession that does not equal the age in its educational machinery, that is unable or unwilling to represent its modes of thought and its forward tendencies in its demands from those who seek admission to its ranks, ceases to be a profession, because it loses its claims to a scientific character.

The methods of thought now developed among the thinkers of every science are educated methods. I mean by this that they observe an orderly routine, follow the established laws of inquiry, never anticipate their own cautious action, never predicate final conclusions until successive steps have justified their emphatic declaration. With these methods of thought our modes of investigation, our instruments and agencies agree, so that the intelligent mind of the day has its counterpart in the appliances it employs to attain its ends. Natural endowments still have their value. Individual skill, personal ingenuity, the keen insight of native genius, yet have their worth. But, nevertheless, a professional man of the present time, much more than ever before, must rely for honorable success on an exact and extended education. This is just as true of medical education, perhaps more true, than of any other form of education. The simplest principles of medical practice, such has been the progress of science, take hold now on a large body

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of facts; kindred sciences and arts have come to our aid; the way of treating disease is daily becoming more philosophic; our knowledge is better systematized; and hence, while the science of medicine has greater power to educate than at any previous period, the necessity for a physician to be educated, in order to avail himself of the advantages of his profession, is proportionably increased. Yet it must be acknowledged that the proper standard of medical education in this country has not been approximately reached.

Nearly a quarter of a century has elapsed since this Association was organized for specific objects, the chief of which was the elevation of medical education. The deplorable ignorance of many young men who receive the distinction of a diploma is known to all. The calls for reform have been loud and earnest. We have had investigations, reports, addresses, until the subject has been presented in every variety of phase. The argument has been fully made, and as fully accepted; it has been indorsed by the medical journals of the country, by the colleges themselves, between which and the profession no difference of opinion exists as to the theoretical question involved. Yet, practically, the subject remains just where it was when it first claimed the anxious consideration of the profession in this country and led to the creation of this body, with a view to organized efforts for a radical change.

I do not allude to this subject in the hope of adding any new facts, or of bringing forth any arguments more forcible than those contained in your former *Transactions*. But my purpose is to keep it before the mind of the Association, as a matter of vital importance to every interest in the country. Standards of requirements, varying somewhat in degree, but always deemed moderate, wise, and just, have been submitted to this Association and recommended by its action to the adoption of the medical colleges; and whilst they have seemingly met the approval of all, with perhaps one exception, they have yet failed to obtain the compliance of any. To enforce reformation where so many different and conflicting interests are concerned, is a most difficult and embarrassing task. In governments, revolutions are sometimes quick and violent. The dethronement of monarchs, the overthrow of empires, the downfall of nations, the blotting out of statute-books which may have been the slow product of ages, may be the *coup d'état* of a day or an hour. Such, however, is not the case with the laws and usages regulating the modes and forms of education. The capricious vicissitudes of human fortunes which pass by us in such rapid

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succession, working in some instances the most speedy and salutary changes, are unknown to those arrangements which relate to the propagation of scientific truths. Revolutions of this kind may properly claim the calm and deliberate attention of the leaders of thought, and particularly when they involve the tedious and toilsome work of training the mind for an arduous profession.

Yet, conceding the difficulties of the case, we must confess that twenty-two years of organized effort, directed mainly to one object, and characterized by the diligence, industry, and zeal in a numerous and learned body of men, should have presented some substantial results as the reward of so much valuable thought and untiring labor. Despite the earnest and pleading appeals that have gone from this Association, a strange and fatal neglect exists among our medical colleges in regard to the highest interest of the profession, viz., the introduction of such modes and the appliances of such tests in connection with professional education as shall secure the ends of instruction and disciplinary training. If professional education means anything, it means a specialized form of culture, such a culture as consists in acquiring pertinent facts and precise principles, and, furthermore, the intellectual art of using said facts and principles with a reasonable degree of dexterity and skill. It presupposes the ordinary education of a gentleman; it begins at that point; and if this be lacking, the specific professional education is, in a majority of instances, radically vitiated, and so vitiated because few men are competent to receive a specific form of culture unless they have antecedently had a good general culture. Yet the distinguished Prof. Henry Miller, one of the former presidents of this Association, and for years a teacher of medicine in one of the first medical schools in the United States, borrowing and adopting the language of the far-famed Dr. Drake, declared, in his official address before this body in 1860, that he was constrained to say, "even at this late period, the profession abounds in students and practitioners who are radically deficient in spelling, grammar, etymology, descriptive geography, arithmetic, and I might add book-keeping, but that they generally apply themselves to the study of this important branch with a diligence that supplies the want of early opportunities." And he adds, "All candid men who have had any experience in medical schools must confess that the examinations of the *green-room* annually reveal a sum of ignorance or of vague and misty perceptions of fundamental medical truth, even in many who are invested with the honors (?) of the

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doctorate, which is truly amazing. For myself, I can solemnly declare that the most mournful and humiliating passages in my professional life have been these annually recurring examinations, in which such scanty harvests have been reaped as the reward of a winter's faithful toil."

Think for a moment what the idea of an educated physician embraces, and then place it in antithesis to the statement made by Dr. Miller. Apart from the preliminary culture that initiates him into the world of knowledge and secures him some tolerable command of his mental faculties, a physician is expected to understand the human body, its complicated structure, its nervous and muscular offices, its various organs and their interactions on one another, its laws of health and disease, its relations to soil and climate, and its susceptibilities to the influence of mind and civilization. Add to this the remedial agents he employs, the use of those resources which his art has provided, and his unceasing need for an acquaintance with chemistry and its correlated sciences. What is equally essential, a physician's habit of thought must be estimated. And what a scope this includes! what a compass of calm but intense insight, of philosophic clearness, of studious induction! When I think of the single faculty of judgment; of the infinite painstaking necessary for its cultivation; of the co-ordinated functions of association, suggestion, and comparison that attend its action; of the vast number of constituent qualities that combine to form a truthful, reliable, and trustworthy judgment; and when I think that this is the master-power of a physician, and can only be acquired as the latest fruit of broad and comprehensive generalizations, and as such is mainly due to early habits of patient and assiduous study under the best preceptors, I am unable to imagine any temerity more rash, any arrogance more supercilious, any ignorance so fatal, as those which can rush unprepared into the responsible duties of the profession of medicine. I know of no man whose professional education, as to stringency of obligation and sanctity of motive, can rest upon truthfulness of heart with such weighty considerations. I know of no man on whose intellectual and educational fitness for his position so much depends, either for weal or for woe. Without the least exaggeration, it may be affirmed that there is not a single attribute of mind or body which is not susceptible in a physician of such education as to enhance his professional worth to himself and the community. The proper development of his senses—the eye that can see accurately, the ear that can discriminate among

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the faintest sounds, the touch that responds to the slightest impression; the management of his own nervous system so that it can sustain his intellect when most severely taxed; the exactness of memory in the retention of impressions; the almost artistic vividness necessary for precise delineations; these functions of observation, reflection, and analysis, as fundamental to higher processes of mind, are capable of an extraordinary degree of education, and hence require the most mature and systematic training to give them a right direction.

If this ideal of medical education is not overdrawn, it is not surprising that our Association has shown such a deep sensibility to the current deficiencies of professional training. The full and able report of 1849, by your Committee on Medical Education, composed of men of the highest distinction in our ranks, holds this language: "We regret that candor and justice compel us to admit that the most deplorable ignorance and unfitness for the responsible duties of a physician are often exhibited by those who hold the diploma, and who are thus indorsed as being qualified and competent. This fact is so notorious, that it would be a waste of time to cite instances in support of it." This is the language of the Committee; and numerous other extracts, equally authoritative and decisive, could be furnished from your own *Transactions*, in confirmation of the fact under notice. Nor has there yet been any substantial advance towards correcting the evil. The practical questions are, then, with whom lies the fault, and what is the remedy?

The first and undoubtedly the fundamental error in our system is one already adverted to—a defective preliminary education. Nearly all writers on this subject have tried to rest the blame upon the private preceptor into whose office the student of medicine is first received. Contending that it is his duty to ascertain the fitness of his preparatory education to qualify the student for the study of medicine, they put upon the preceptor the onus of deciding this point. I cannot see the justice of this demand, nor do I think it safe to rest the responsibility upon this party. In the first place, the colleges have no standard for preliminary education, and this the preceptor knows; and in the next place, the preceptor himself may be one of those spoken of by Professors Drake and Miller, and hence incompetent to decide even on acquirements in spelling, grammar, etc., to say nothing of the ill grace he would show in closing his office against a young aspirant on the ground of deficiencies which in his own case the medical colleges had

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overlooked. Nor is the student to blame, since he cannot see the necessity for a preparatory culture, while, perchance, he has made it a matter of calculation on mere grounds of business. If he enters on the study of medicine as a trade (as undoubtedly many do), he wishes to get his profession with the least possible outlay of labor, time, and money; so that, viewing it from his standpoint, if the diploma can be obtained on the basis of an imperfect scholastic knowledge, he justifies himself in his neglect. Granting that the private preceptor should inquire into this matter (and it is certainly better that he should do so), yet, through the imperfection of his own standard, or through insensible favoritism, he may accord to the student qualifications not possessed. But whatever may be the judgment of the preceptor, however well or ill his initial duty may have been discharged, the responsibility of the medical college for his matriculation remains unaffected. The power is in its hands to arrest the evil in its incipiency, and it is precisely at this point that the power which has been lodged in its possession as a chartered right, and which constitutes it the safeguard of the profession, should be firmly and emphatically asserted. Not only is a medical college bound to give instruction and training, but it is equally bound to see that its matriculants are fit subjects for its instruction and training. The shipping merchant looks to the seaworthiness of his ship as well as to the skill of the captain to whom he intrusts his cargo; and the farmer examines the soil as anxiously as the seed, if he has any pretensions to the science of agriculture. But, in most instances, our colleges ignore the necessity for a parallel inquiry into the capacity of young men to receive the benefit of their teaching. Foundation or no foundation, they are the architects of a superstructure; corner-stone or not, they are intent on towering stories, pilasters, architrave, and dome. Nor, indeed, need the rain descend, nor the floods come, nor the winds blow and beat upon that house, until it fall; nature may spare the punishment of its sandy basis — it falls by its own nothingness.

To see this subject in a full light, bear with me while I sketch a medical student's life in this country. There are many exceptions to what I shall say; but while this is gladly admitted, the tendencies of our present mode of education may be faithfully represented. I honor these exceptions in students who prepare themselves for the study of medicine, and in those colleges that have due respect to the character of the profession in the confer-

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ment of the doctorate. But in the ratio that these exceptions are distinctly marked, the system itself stands condemned.

When a young man has determined to study medicine, he applies to a physician for admission into his office, or not unfrequently for the loan of his books, preferring to study at home, in order to save expense. The preceptor thus selected is generally the friend and physician of the applicant's family, and receives him, in most instances, without hesitation and without inquiry. A work on anatomy is put in the student's hands, and perchance a few plates or bones superadded, which, when left to himself, he studies and understands to but little profit. Engaged in private practice, often limited in means, struggling for daily bread, the preceptor has frequently neither the time nor the appliances (if indeed he has the professional education) to render that assistance to his student which his crude intelligence and unformed habits demand. The art of the teacher, the rarest and noblest of arts, which, combining in itself the endowments of nature and the acquirements of knowledge and experience, this directing and inspiring art is denied the student at that period when his age and impressibility most urgently require its presence. Ordinarily, the preceptor has no ambition to be a teacher, seldom has he pupils sufficient to remunerate his labor or enlist his feelings, while the sense of responsibility is materially lessened by the fact that the student will pass from his hands to the oversight of those whose business obliges them to superintend his preparation for active life. The more fortunate students have perhaps the aid of lectures and demonstrations in addition to instruction and text examinations, but even in these instances the want of method and of systematic training greatly abridges the theoretic benefit.

A year or a portion of a year passed in this way, whatever the progress, or whether any progress at all, the student then enters a medical college. Here he is expected to receive "two full courses of lectures," which usually occupy the succeeding winters, though in some instances attendance upon a winter and a summer course immediately following will entitle him to an examination. No conditions are imposed upon him by the college. No examination is had into his capacity to profit by professional instruction. If he matriculates, and purchases the professors' tickets, it is enough. Any man can enter a medical college in this country without having gone through even the jest or mockery of spending a year in a private preceptor's office, and by simply paying the fees

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required, which, in addition to being at times ridiculously small, may often be conveniently arranged by promissory notes to be paid out of his future professional income.

The matriculation and purchase of the professors' tickets constitute him a member of the class. No rules compel him to attend the lectures, no means are employed to ascertain whether he does so or not. If he choose, he may submit to daily examinations, or he may avoid them altogether. Should he leave the lectures and return home, it does not impair his right to be a candidate for graduation at the next term. The exercises of the college, which he now has the privilege of attending, if he sees proper, generally continue about sixteen weeks, sometimes less, in a few instances more. From six to twelve professors occupy the term, more frequently seven or eight, each of whom delivers from three to six lectures a week. Little time is left the student if he attends these lectures. Ample provision, in most instances, is made for dissection, and, nominally, some time is demanded, by a few of the colleges, for its prosecution during the second term; but any close and earnest attention to it is impossible, unless other duties, deemed by the student of equal importance, are neglected, and hence few acquire an intimate and practical knowledge of anatomy during their pupilage. In some of the colleges he may attend hospital clinics two or three times a week, or daily. Owing, however, to his very limited time at college, and the multitude of other duties crowded into this brief period, together with the rare opportunities afforded for a personal and satisfactory examination of cases by the student, this very important auxiliary to the study of medicine is used to but little purpose, in view of the large amount of materials for clinical instruction which many of our colleges control.

Thus, with lectures through the day, private quiz-clubs, lager-beer saloons, and theatres at night, the student consumes his first term, which, though short enough, he is apt to desert several weeks in advance of its close for the hospitable lounges and easy tasks of his early preceptor. Here six or eight months are spent much like the first period of pupilage, except as he is improved by attendance on the college lectures. At the end of this time he returns to college to complete his second or graduation term, which consists in the repetition of the same routine through which he had previously passed. His recollection of his former self-indulgence, his consciousness of his own defects, and his sharpened sense of lost opportunities, now call for semi-professional treatment. Ready

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to his hand, standing on watchful tiptoe for a call, one of those experts called *crammers*, who hang around the skirts of medical colleges and attain celebrity in the practice of educational quackery, seizes on this unfledged Moses and gives him green spectacles "with silver rims and shagreen cases" by the gross, through whose shining glass he may see all the wonders and mysteries of an examination in the *green-room!* Here, with the aid of conspectuses, vade mecums, convenient analyses, compendiums, and such like books, he is taught all the short roads and by-paths through which he may obtain the degree without understanding anything of the great fundamental truths and principles of the science of medicine. With these convenient and easy appliances, the cheap terms and moderate demands of the colleges before alluded to, added to the very liberal "beneficiary" system lately coming into vogue, and used for the double purpose of obtaining State and municipal aid and swelling catalogues, it is but a short step from the plough-handles to the diploma.

I do not desire to depreciate the class of books alluded to; they doubtless have their uses, though they are certainly not such as should constitute the chief reliance of the student.

Make the best possible supposition; admit that the student had a sufficient preliminary education; grant that he has been diligent, constant, energetic; yet no one can imagine that this student is learned enough in this brief period to entitle him to the degree of Doctor of Medicine in any other highly-civilized country in the world. But who knows what he is or what he has done? He has submitted or not to examinations; has attended lectures and hospitals or not; has engaged in dissections or not; has been a spend-thrift of time or not—just as it suited his taste and temper. Despite of all, he is allowed to offer himself for the honors of a degree, and to undergo perhaps the first and only examination to which he has ever been subjected. The exceeding rareness of such an event, one would venture to surmise, would clothe it with dignity, if not indeed with majesty. Previous to this a few inquiries are put to him, the first of which is as to whether he is twenty-one years of age. If he is only two or three years short of this, many consider it no valid reason to forego the examination. The next requirement is that he shall have been engaged for at least three years in the study of medicine, including his private study with a respectable physician and his attendance upon lectures. If put at all, the question as to this requisite is often a matter of form, and if

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answered negatively, which is not likely, would hardly debar the student from the privilege of an examination. It is by no means an uncommon circumstance for students to begin the study of medicine by attendance on a winter's course of lectures, without ever having looked into a medical book, and then graduate at the succeeding term.

The next requisite is that he shall have attended two full courses of lectures, the last one being in the school in which he proposes to graduate. Answer and proof are in the production of the tickets. He may have attended two full courses, attended one lecture a week or none at all, and the professors be none the wiser. Tickets reply to the question. No check has been instituted, no resource against imposition, no roll-calls, no cards, no weekly or monthly registry of names, no witness of any sort as to attendance upon the lectures, or even as to his presence at the college since the purchase of the tickets. Another step follows—"an acceptable thesis in the handwriting of the candidate" must be presented. He is not examined upon it; whether it is the production of his own brain or not, is not ascertained; the handwriting is conclusive proof as to authorship, and the genuineness of this, in most instances, perhaps taken for granted. Proper testimonials of a good moral character form the final requisition. So far as my information extends, this requisite finds a place only in published announcements or in the closed pages of charters and by-laws, being seldom demanded and still more rarely furnished. Professors have been known to visit city prisons to become bondsmen for students who have violated the common decencies of life, and within a few days thereafter affix their names to the diplomas of these men.

Such are the nominal requisites preliminary to an examination for a degree in most of our colleges. Few, simple, and reasonable enough, certainly, yet we have reason for believing that frequently they are not insisted on (the one touching the tickets excepted); or if urged, that they may be answered in the negative, and yet the candidate not refused an examination. The theory of this examination is founded on the idea of three years of study. But if the time is fairly measured, no one can suppose that more than one year is judiciously employed, or what would be the equivalent of one year spent in a first-class school under competent masters.

The student now goes before the faculty for his final examination. All require that he shall stand "a satisfactory examination," though the meaning of these words is very different in different

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schools, as well as the modes of examination. In some instances one hour is considered sufficient for the purpose, allowing to each professor some eight or more minutes. In other instances, where these oral examinations are made separately, perhaps as much as thirty or forty minutes may be consumed by the professor in forming his estimate of the qualifications of the candidate, with whom he is then perhaps for the first time in his life brought into close contact, and with whose moral, intellectual, and educational fitness he has been up to that moment a total stranger, often commencing his examination by an inquiry as to the name. Although some of the colleges are more rigid than others, yet it so happens that he must be signalized by dulness and stupidity if he fails to obtain his diploma at the end of the second term from the best of them.

The student is now a physician. Can any one deny that the honor of the doctorate has been too cheaply bought? Give such a man talents, or even genius; give him the acquiring virtues that concentrate, intensify, and inspire intellectual exertion; exhaust means and agencies in his behalf, and what are the probabilities that he is furnished for his work, trained for its toils, fortified for its trials, and imbued with its formative spirit? Is he ready for "the high endeavor and the glad success"? A plea in justification is offered in the demand for doctors. But are these men doctors or likely to become doctors in any other sense than a diploma constitutes a doctor? If there did exist a demand for ignorance and incapacity, our plain duty would be to refuse such demand. The argument was always weak, it is now pitiable. It may have some force as to certain trades, but the status of a profession has always been self-determined; its title to confidence and respect is the product of its own mind; and whenever it primarily looks to the outer world for the assurance of its strength and the measure of its renown, it has extinguished the instinct of its life, and let itself down to the sordid level of the market-place.

Moreover, it is a libel on the powers of nature to suppose that the world needs indifferent doctors when good ones cannot be procured. The quality of good, as professionally applied to physicians, can only be ascertained through its conventional meaning—its relation to the highest standard approved by the civilized world. Comparisons are doubtless odious, but a sound judgment is impossible without them. If, then, the medical colleges of this country, forming so important an element in its social structure, identified

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with a nation that has achieved magnificent results in art, science, and general civilization, and throbbed its awakening life far beyond its continental limits—if these institutions, charged with the honor and usefulness of a calling that belongs to the first of the accredited sciences, claim the right to bestow the prerogatives of the profession upon men who would be deemed, in most other civilized countries, unworthy the position of subordinates in a hospital, is it not reasonable that those who have a common interest with them, and are painfully observant of these flagrant abuses, should give a just expression to their disapprobation; should enforce that expression from the deep impulses of mortification; should kindle its words, if need be, with the fires of impassioned jealousy? Let none imagine that the remonstrance is other than the dictates of truth and justice—made, not with the desire to wound or irritate, but with the hope of awakening convictions as to existing abuses, and of exciting an enlightened effort for their removal. Every right-minded man likes to praise much more than to blame; but when we see the irregular and imperfect system of training under which the medical student is educated in this country, and witness the alarming ease with which the diploma may be obtained with the most trifling qualifications, and compare these with the established systems and rigid demands of the European schools, we cannot help feeling that the usefulness of our profession and the interests of society are seriously hazarded, and it surely becomes us to forget ourselves and all individual interests in an effort to correct the evil.

Without doubt, we have master-minds in our profession in this country engaged in teaching. Tried by any standard which the older civilization of Europe may set up, many of our professors are men entitled to fame and just distinction; but are such men the natural outgrowth of our systems of education or in despite of them? One of the peculiarities of genius is its self-creating force, by which it bends circumstances to its will, shapes them to its purpose, and stamps them with its image. The real test of systems of education is in the average intellect they call into healthful activity and direct to great ends. Such exceptional men as we have spoken of—men who, like streaks in the early dawn, shine forth from the darkness out of which they spring—possess that sure instinct of greatness which the paucity of early helps cannot restrain. Besides, many of these men obtain their highest training by visiting the schools of Europe. Who ever heard of the reverse

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being true? Who ever heard of a gentleman leaving the schools of Paris or London for a more thorough education in America? If, then, we have the rare felicity of admiring these men—these great lights which rise in the face of our present system—a better system would multiply their number, and, what is equally desirable, or even more to be coveted, it would furnish us a vast body of thoroughly enlightened and intelligent physicians; physicians for the million, that, like the table-lands of our continents, would spread their broad spaces for our wonder and delight. Advanced thinkers, discoverers of new truths, originating intellects, these we must have; but, besides them, we must have medium capacity that may appropriate their thoughts, assimilate their influence, and diffuse the advantages of their superior culture. Perhaps nineteen-twentieths or more of the practical duties of the profession are discharged by this class of intellects. Nor can this end be attained without a liberal method of general education. Our men of genius are largely lost to the profession, simply for the reason that hundreds of physicians are positively incompetent to appreciate them and their immense services. And this humiliating state of things cannot be changed until we educate our youth to a higher recognition of themselves, and thereby place them in closer sympathy with the gifted and learned of our profession.

To see how far we are behind the age, let us now glance at medical education abroad. I can tell you nothing on this subject which is not familiar to you all, and refer to it only for the purpose of comparison. Though the systems in Europe differ somewhat in details, they yet have a marked uniformity as to the measure of attainments necessary for a degree. All these systems have more or less the cardinal idea of a professional education which is twofold: first, the preliminary culture requisite to form an intelligent gentleman; and secondly, the specific culture branching out from that, and directed to a definite object. Acting upon that high sense of intellectual truth which centuries of local civilization have perfected, they demand that one shall be an educated man before he becomes a physician. The French nation perhaps presents a fair type of the educational demands of the European schools. Before a student can matriculate in a medical university of France, he must present his diploma of "Bachelor of Letters;" and previous to graduation he must show his diploma of "Bachelor of Sciences," equal to the degree of A. B. in the colleges of this country. Nor are the requirements as to age and moral character dead letters,

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for they are met by well-authenticated certificates or proofs. No man can matriculate who is under the required age, or who has been convicted of any crime. No favoritism and no expediency vary these rules. They are fixed and inflexible. The order of procedure compels the student to deposit his diploma of "Bachelor of Letters," the written consent of his parents, the certificates of his birth and character, with the secretary of the faculty, before his name can be enrolled, and then a certificate of registration ("*carte d'inscription*") is given. This inscription he renews quarterly until he has registered sixteen times, thus requiring sixteen courses of lectures and four full years in the university. He cannot enter the college before he is eighteen years of age, and consequently cannot graduate before he has reached the age of twenty-two.

In Austria, and perhaps some other countries, his pupilage may last from five to seven years before he offers for final examination.

Attendance upon lectures does not mean the purchase of tickets (in most European schools the professors are paid by government), but it means actual attention, hard study, and satisfactory progress, as tested by repeated examinations. Anatomical dissections, practical pharmacy, hospital attendance, are compulsory.

In France, the student at the end of the third year must produce his diploma of "Bachelor of Sciences," besides being examined on the studies required for that year. Different courses are assigned to different years, the student being examined in July of the first, second, and third years on the studies embraced in those years. Should he fail in either of these examinations, he can have a rehearing three months after; when, if he fails again, he cannot take out a new inscription until another year has passed. From the eighth quarterly inscription to the sixteenth, embracing a period of two years, he is required to attend the clinics of the hospitals, the reason of the rule being that two years of college instruction are deemed necessary to prepare him for clinical instruction. Previous to graduation, five rigid examinations are had, and thorough proficiency required. The last one is entirely practical. Two medical or surgical cases are selected by the professors, and the candidate is expected on the spot to give the correct diagnosis, prognosis, and treatment in the presence of a number of the faculty. The thesis, which must be printed and copies placed in the library of the faculty, is submitted to the closest scrutiny, and its author required in public *viva voce* discussions to defend it against all assailants. Additional to this, he is tested on questions propounded

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by the council royal. To avoid all collusion or favoritism, these questions are placed in an urn, and drawn by lot, so that every possible safeguard is adopted to secure thoroughness of preparation before a diploma is given.

Not only is great emphasis laid on a collegiate education as preliminary to medical study, but the branches taught in a medical course are much more numerous than in this country. The curriculum in most of our schools includes only eight or ten departments, while in Europe many of the institutions embrace nearly three times that number. Some of the colleges have as many as fifty or sixty professors and assistant professors. In the medical department of the University of Paris, there are twenty-eight professors and twenty-nine assistant professors, besides a dean; while in the University of Berlin, there are twenty-eight professors and thirty-eight assistant professors. Besides this numerical strength, a professor in one of these universities or colleges is a thoroughly educated gentleman—a man of general science, who, by virtue of large culture, has broad sympathies, and is thereby able to dignify and adorn his own specialty by means of resources drawn from the wide domains of knowledge and thought. The selection of men for these positions is conducted with the utmost care. None are chosen except through competitive examinations, nor until the extent of their acquirements, the scope of their talents, and their aptitude as teachers have been most unequivocally demonstrated. I need not detail how this is managed with our countrymen—the petty diplomacy, the artful manœuvring, the agency of politicians, the conciliations of sectional prejudices, the desire to advance personal interests, which belong to the machinery of electing professors. No doubt this machinery will now be enlarged, to take in military services and sacrifices, and that, too, in the face of the fact that professors are found in this land who could not matriculate as students of medicine in any of the respectable European universities.

Happily for the hopes of reform, our wisest professors have been the most sensible of these evils, and most sensitive to the immediate and urgent need for their removal. But a few weeks since I received a letter from a gentleman who is one of the most distinguished surgeons of the age, who has been engaged during the greater portion of a long and brilliant life in teaching, who has held professorships at different times in several of the foremost colleges in the Union, and who now occupies a chair in a school which does honor to the profession through its forward tendencies

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on the subject of medical education, which contains the following most gloomy and disheartening allusion to this subject: "The future holds out no promise of amendment. We shall go on from bad to worse until the people can stand it no longer, and then we may hope to be able to effect some reform by our efforts as a great national association. The medical schools are getting worse every year, belowering the standard of education, and opening their doors more widely by the reduction of their fees. The time is near at hand when honorable men will cease to take any interest in medical teaching."

If our foremost men in the colleges could accomplish this great revolution, it would soon be accomplished. But at every step they are crippled by a power which they cannot persuade nor coerce, and which they can neither afford to respect nor despise. No one can deny that we have colleges in this country, organized in fact for the sole purpose of advancing the local reputations of the professors, which have not the great interests of the profession at heart, but which have all the chartered rights of our first-class colleges. If, unsupported by these, our best schools exact of students the prerequisites for an honorable graduation, this will only end in augmenting the evil, since their patronage would forsake them and fly to schools less stringent.

Your action in Baltimore, May, 1866, under a resolution introduced by Professor Davis, of Chicago, secured a convention of representatives from about eighteen colleges, which assembled May, 1867, in Cincinnati. The plan adopted by them, if accepted and executed by the colleges, would effect the greatest results. It was conceived in the spirit of moderation, and with a full consciousness of the difficulties in the way of reform. The report was received by this Association and published in your *Transactions*, but it will serve no purpose beyond evincing the wisdom and public spirit of these medical teachers and your own appreciation thereof, unless new measures are devised to render it effective.

By the very act of your creation, you stand committed to a reform in medical colleges which, in your own language, shall establish a "uniform and elevated standard of requirements for the degree of M. D." You have already done much good in some directions, but, so far as your original object is concerned, you still owe to the profession and to society this unredeemed pledge. If the fulfilment of this aim was worthy the labor already bestowed, and which, though unavailing, has exemplified your cherished pur-

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pose, it deserves yet another effort. The sphere of your action has been wide; the sphere of your power has been narrow, and limited to the means of advice and recommendation.

The plan of action you have adopted, that of endeavoring to induce forty or fifty medical colleges, with conflicting interests, to agree voluntarily upon a "uniform and elevated standard of requirements for the degree of M.D.," and adopt it in good faith, has become almost a Utopian idea, a forlorn hope. Though urged with all the force that truth could impart, and enforced with all the appealing earnestness that the gravity of the subject could inspire, yet your views and wishes have not impressed themselves on the schools to such an extent as to change their course of action. It seems to me that all hope of reform through this means must be abandoned. Nor can we expect to reach the end proposed by measures of State legislation. The obstacles here are too palpable to need enumeration. They are many, and they are insurmountable. Almost any body of medical men may obtain a charter for a medical college in most of the States of this Union, with pretty much such regulations and privileges as they may agree upon among themselves and ask for.

I despair, therefore, of seeing this Association attain its object through any of the agencies heretofore employed. If, however, this great work *ought* to be done, it *can* be done. I believe it is within the reach of the power of this Association. But I can see no mode by which it can be accomplished, except through FEDERAL LEGISLATION.

Time does not permit me to enter into details, if indeed I felt myself competent to discharge such a task. I shall, therefore, only make a few brief, crude, and imperfect suggestions, in the hope that they may engage the earnest thoughts of those more competent to assist them to a practical and finished direction.

I would advise that we appoint a committee of our wisest and best men to digest a plan for one or more NATIONAL MEDICAL SCHOOLS, and to memorialize Congress in behalf of the enterprise. Let the plan embrace as a basis the features presented by the Cincinnati convention of teachers; let these schools or universities confer such distinctions and privileges as will be proportionate to the superiority they demand, and such as will make the attainment of their diploma an object to the ambition of those who engage in the study of medicine; let the chairs be open to all aspirants, and the appointment or election of professors so guarded as to secure

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the very highest talents, the most profound learning, with the most fully demonstrated capacity for teaching. Make the salaries of the professors large, and not to depend upon the number of students; and let the Federal government assume a proper share of the expenses incurred.

The number of these schools may be multiplied as experience may demonstrate their superiority and necessity.

Our present medical schools, and such as hereafter obtain their charters from State governments, may adopt their own regulations; and such as do not conform to the national standard will either become tributaries or preparatory schools to the national universities, or dwindle into merited neglect.

I am persuaded that such assistance on the part of Congress can be obtained. I think that a committee could demonstrate that of the vast amount of labor and money expended annually for the public good, a portion could not be better bestowed for the welfare of humanity and the interests of American civilization than in creating and upholding one or more universities which will perfect the object for which this Association was organized. Such reforms have not been elsewhere effected except through governmental interposition, and our own experience has amply shown that it is vain for us to hope for them through any other means.

I am perfectly aware that any plan looking to the general government for sanction and support has its embarrassments, and that it will be opposed on the ground of incompatibility with republican institutions; but I do not doubt that all objections can be fully answered. The most moderate view taken of the offices of government specifies PROTECTION as its main end, and where, if not here, is protection demanded? Utilitarianism proclaims its conquering motto in the words "the greatest good to the greatest number," and where, if not here, has the motto a consummate application? The recent changes in political science, as well as practical revolutions in the institutions and relations of the age, show clearly enough that, whether for good or ill, governments are becoming more direct representatives of the prevailing public opinion, and are acting more immediately from the popular heart. Tell me how this government could more effectually permeate our homes, our tenderest sentiments, our truest earthly well-being, than by lending its mighty aid to a measure so fraught with patriotic philanthropy. No profession has a sublimer human ideal than ours; none comes closer to the daily evolutions of Providence;

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none touches the individual and social happiness of men at so many points; and yet, standing in this high relation, it is almost alone in the facility with which ignorance may enter and work its mischief. If a student of law receives license to practise his profession, his blunders in the conduct of his cases do not often affect the happiness or well-being of a family; and, besides, his errors may be corrected; his case may be reargued; and, withal, he belongs to a profession jealous of its intellectual power and most sensitive to its influence—a profession which compels a man to show what are his merits, to demonstrate to the court, the bar, the jury, and the world his precise abilities, and allows him to win no success not based on professional capacity. But when a young man obtains his diploma from a medical college, he has passed through the only trial the law demands, and has obtained that which society recognizes as the test of merit. Next to the minister of the gospel, the physician appeals to the sentiments of the public mind, and particularly to those sympathies which are least inclined to make close examinations of pretensions. The atmosphere in which he moves is unfavorable to keen criticism; the circumstances of anxiety and often of sorrow, as well as the feeling of dependence under which his professional skill is sought, indispose families to scrutinize his ability, and he is usually accepted with implicit reliance. Outside of the medical colleges, what safeguard protects a community from impositions of ignorance, stupidity, and recklessness in our profession? You all know that society has no redress at the hands of physicians themselves, since their lips are sealed as to censuring comments on the practice of their professional brethren. Two physicians may receive diplomas from the same or different colleges, one may be highly intelligent, the other grossly ignorant. Yet they stand before the community as equally learned and equally authoritative. Through a pleasing and artful address, the ignorant brother may outstrip his more accomplished rival in acquiring the confidence of the community in which they live. The latter may daily witness the gross and even fatal blunders of the former, yet, in view of the creed of common courtesy recognized by general society, as well as the Code of Ethics established by yourselves, nothing would be more unwise than for him to attempt the exposure of his weak and ignorant brother.

There is, then, gentlemen, no safeguard but in a thorough preparation of those who seek to be clothed with the doctorate. To this end you are pledged, and from this position you cannot recede

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without discredit to yourselves and certain degradation to that calling of whose interests you are the highest representatives, the recognized and rightful guardians.

A profession like ours, that is invested with a power of unequalled beneficence; that disdains all mystery, all prestige of authority, and all superstitious veneration for traditional dogmas; that asks for confidence on the sure basis of scientific knowledge, appropriates no discovery to selfish aggrandizement, holds its resources, as the gift of Heaven, open to the good of all mankind, and labors to imitate Him who, nearly nineteen centuries ago, healed the infirmities of the multitude that waited on His ministry of love and wisdom—such a profession should never falter in giving heed to its own instincts, never waver in strenuous and persistent exertions to elevate still higher its practical ideal, and never abate those heroic convictions which are at once the proof of its high vocation, the credentials of its claims on public respect, and the pledges of its sure success.

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REPORT

OF THE

COMMITTEE ON MEDICAL ETHICS.

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REPORT OF THE COMMITTEE ON MEDICAL ETHICS.

To the American Medical Association:

The Committee of Ethics, to whom was referred for investigation a charge presented at the last session of the Association, by Drs. W. T. Taliaferro and J. H. Buckner, of Cincinnati, Ohio, against Dr. A. G. Field, of Des Moines, Iowa, accusing the latter gentleman with "conduct grossly unprofessional," in violation of the letter and spirit of the Code of Ethics, have the pleasure to report that the difficulties under which the said charge originated have been amicably adjusted between the parties interested, and that, in consequence, the charge has been withdrawn by Drs. Taliaferro and Buckner, as will appear from the annexed communication of Dr. Edward B. Stevens, of Cincinnati.

The copy of the *State Register*, published at Des Moines, Iowa, February 5, 1869, containing the card of Dr. Field referred to in the communication of Dr. Stevens, accompanies this report.

D. FRANCIS CONDIE,
Chairman Committee of Ethics.
N. S. DAVIS,
W. O. BALDWIN,
H. F. ASKEW.

May, 1869.

A CARD FROM DR. FIELD.

EDITORS REGISTER: My attention having been called to the fact that a letter written by me relative to the condition of J. M. Dixon, Esq., late local editor, and published in the *Daily Register* of May 12, 1867, has been understood as an attack upon the professional reputations of Drs. Taliaferro and Buckner, of Cincinnati, Ohio, I desire to say that it was not intended to be such. The object of the communication, whatever it was, was to allay certain apprehensions on the part of some of Mr. Dixon's friends, as was generally

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understood, and any inadvertency or indiscretion, that could be considered as detrimental to the reputation of any medical gentlemen, and especially to that of the eminently distinguished oculists above named, was in effect unjust.

A. G. FIELD.

CINCINNATI, March 17, 1869.

DR. D. FRANCIS CONDIE—

DEAR SIR: At the meeting of the American Medical Association last year the complaint of Drs. Taliaferro and Buckner, of this city, against Dr. A. G. Field, of Iowa, was placed in your hands, as Chairman of the Committee on Ethics, to report at the meeting at New Orleans in May.

Some months ago, Dr. Field wrote to me, desiring that myself and Dr. W. W. Dawson, of this city, act as arbitrators of the difficulty, and endeavor to settle it amicably, and thus prevent its appearance before the Association. We had interviews with the complainants, and finally it was agreed to *withdraw* the charges, and request you to act accordingly, Dr. Field publishing in the Des Moines *Register* a card *explanatory*. This he has done, and, I presume, has sent you a copy.

All that Drs. Taliaferro and Buckner now ask in the premises is that you report to the Association that the charges are withdrawn, "Dr. Field having made satisfactory apology and published an explanatory card," or something to that effect.

I am very glad this termination has been reached.

I am, very respectfully, your obedient servant,

EDWARD B. STEVENS, M.D.

CINCINNATI, April 20, 1869.

D. FRANCIS CONDIE—

DEAR SIR: In the case of charges preferred by ourselves against Dr. A. G. Field, of Des Moines, Iowa, at the request of some of his friends, we have agreed to withdraw the charges against him, provided he would make an apology through the columns of the same paper (the Des Moines *State Register*) in which his article appeared which gave rise to our charges against him, and the fact that such apology had been made to be stated to the American Medical Association.

We herewith forward the published apology, and upon this

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being read or a proper explanation being made to the Association, we hereby authorize the withdrawal of the said charges before that honorable body.

Respectfully,

W. T. TALIAFERRO, M. D.
J. H. BUCKNER, M. D.

Further Report of the Committee on Ethics.

Certain resolutions from the Baltimore Medical Association, presented at the last meeting of this Association and referred to your Committee, were unaccompanied by the names of the members whose action was complained of, neither were there any proper specifications under the general charge. Hence, while we deem the action complained of by the Baltimore Medical Association highly censurable, we can recommend no measures to be adopted by this Association in relation thereto.

Certain complaints made concerning the charter and the mode of conducting the exercises of the Atlanta Medical College were also referred to your Committee. But in this case also the complaints have not been accompanied by such specifications and documents or other evidence as are necessary for making a proper investigation of the subject. We therefore ask to be relieved from its further consideration.

All of which is respectfully submitted,

N. S. DAVIS,
W. O. BALDWIN,
H. F. ASKEW.

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REPORT

OF THE

DELEGATE TO THE BRITISH MEDICAL ASSOCIATION.

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REPORT OF THE DELEGATE TO THE BRITISH MEDICAL ASSOCIATION.

THE undersigned having been appointed a delegate to the British Medical Association, begs leave to state that he had the honor, in conjunction with two other members of this body, to attend the thirty-sixth annual meeting, held at Oxford during the second week in August, commencing on Tuesday, the 4th, and terminating on the following Friday. His associates were Professor B. Fordyce Barker, of New York, and Dr. Samuel J. Jones, of Chicago. Several other American physicians were present, but not as accredited delegates from this Association.

The meeting was largely attended, nearly five hundred members, including many of the most distinguished medical men of Great Britain, being present. Besides the delegates from the United States, there were representatives from France and Germany, the whole exhibiting an array of talent and scientific attainments rarely witnessed on such an occasion. All the foreign delegates had apartments allotted to them at the different colleges; and, while they were individually treated with great courtesy and hospitality, there was no formal introduction either at the general meetings of the Association, or at the Association dinner given towards the close of the session. This might have been regarded as an omission, had it not been, as the American delegates were informed, in strict conformity with the practice of their British brethren.

The first day of the meeting was spent mainly in the delivery of the admirable inaugural address of the President, Dr. Henry W. Ackland, Regius Professor of Medicine in the University of Oxford, and the organization of the different sections, of which there were five, namely, Medicine, Physiology, Surgery, Midwifery, and Public Medicine, presided over, respectively, by Sir William Jenner, Professor Rolleston, Mr. James Paget, Sir Charles Locock, and Mr. John Simon.

These exercises were followed by the Address in Physiology by

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Professor Rolleston, by that in Medicine by Dr. Gull, and by that of Professor Haughton, of Dublin, on the Sources of Vital and Mechanical Force derived from Food, and its Influence on Medical Practice. The addresses were elaborate and finished productions, and were listened to with profound attention, their delivery being frequently interrupted by loud applause.

One of the most remarkable papers brought before the Association was the Report of the Committee on the Action of Mercury as a Cholagogue, read by its chairman, Professor J. Hughes Bennett, of Edinburgh. It was drawn up with great ability, and was founded upon a series of elaborate and pains-taking experiments performed upon dogs, with the result of showing, as the committee declared, that mercury, instead of promoting the secretion of bile, as is generally supposed, rather tended to prevent it, thus, if we adopt the conclusion of the report, completely upsetting all preconceived notions upon the subject. In listening to the reading of this paper, two circumstances naturally suggested themselves to the reflecting mind: first, are dogs men, or men dogs, that the action of mercury upon their livers should be precisely similar? and, secondly, is the experience of physicians, in different regions of the world, during the last century and a half, of any value in settling any questions in practical medicine?

The Association consists of two classes of members, ordinary and honorary, the former being duly qualified members of the medical profession, and the latter men, whether medical or non-medical, of scientific eminence, resident in the united kingdom, in the colonies, or in foreign countries. The honorary members are not entitled to vote. There are no members, as with us, by invitation.

The meetings of the sections were conducted with great regularity and spirit, many papers of value and interest were read, and the discussions were frequently warm and animated. Of the more elaborate papers only abstracts were read; and each speaker was restricted at first to ten, and afterwards, as time became more important, to five minutes. All the committees seemed to be ready with their reports, presenting, in this respect, a striking contrast with the proceedings of our own Association.

A list of the names of the delegates of the Association, with their residences, and Oxford addresses, was issued immediately after the opening of the meeting, and was of great convenience in facilitating interchange of visits and business transactions. A journal of the

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proceedings appeared every morning during the session, indicating the business of the day, and the hours and places of meeting. The undersigned would respectfully suggest the adoption of a similar plan by this Association.

The social meetings were agreeable and cordial. The learned and hospitable President's soirée at the University Museum, a magnificent edifice, well stored with choice objects in natural history, was particularly interesting, and will long be remembered by those who had the happiness to participate in it. It was numerously attended both by gentlemen and ladies, and was rendered the more interesting by the free circulation of the wassail-bowl, a novelty never previously witnessed by the American delegation.

The gratification of the soirée was much heightened by the exhibition, under the supervision of members of the Association, of surgical instruments and appliances; of casts, models, photographs, and drawings illustrative of medical and surgical subjects; of new drugs and pharmaceutical preparations; of pathological specimens; of models of inventions relating to hygiene and other matters of public importance; and, lastly, of new books, especially those containing illustrations. All these objects were systematically arranged, and accompanied by concise descriptions, the expense of packing and transportation being defrayed by the exhibitors. The display, by Professor Lionel S. Beale, of King's College, London, of microscopical specimens of the structure of certain tissues and organs of man and animals in health and disease was particularly attractive.

The Association dinner, as it is termed, came off on the evening of the third day of the session, at the Hall of Christ Church, the President, Dr. Ackland, in the chair, with the Vice-Chancellor of the University of Oxford on his right. Each member, the foreign delegates included, paid an admission fee of one guinea. After the cloth was removed, numerous speeches were made, interspersed with vocal music; great hilarity prevailed; and at a late hour the company dispersed, well pleased with the occurrences of the evening.

From what transpired at the dinner, and, subsequently, in private, there is reason to believe that the British and American societies will soon establish a regular interchange of delegates, and thus place themselves in the most intimate and friendly relations. Special attention was invited to this subject in a short address which the undersigned had the honor to make on the occasion referred to; and he afterwards learned from the President, Professor Ackland,

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that the subject, upon being submitted to the council of the Association, had met with the most favorable consideration, although no definite action had been taken when the meeting adjourned. Such an interchange of courtesy on the part of these two great bodies, representing, as they do, the talent and scientific attainment, and the great educational interests of the two countries, could not fail to prove mutually beneficial to the American and British nations in every sense in which the subject can be contemplated.

The Association is the proprietor and publisher of the *British Medical Journal*, the immediate organ of communication between it and the medical profession at home and abroad. It is edited by one of the members, and is issued at London, once a week. The question naturally arises, whether a journal conducted on a similar plan would not greatly conduce to the interests of this Association.

The next meeting of the British Medical Association will take place at Leeds, on Tuesday, August 3, under the presidency of Dr. Charles Chadwick, of that city. Any delegates that may be sent by our Association will be sure to meet with a most cordial welcome.

In conclusion, the undersigned hopes that this Association will hereafter have its annual Association dinner, each member who may wish to participate in it paying for his own ticket, in imitation of the custom of our transatlantic brethren. Such an arrangement would effectually obviate the necessity for any public entertainment on the part of the profession of the place where the meetings may chance to be hereafter held, and which has heretofore, on more than one occasion, been a source of so much vexation and annoyance.

S. D. GROSS.

PHILADELPHIA, May 1, 1869.

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LETTER

TO

PROFESSOR EHRENBERG, OF BERLIN.

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LETTER TO PROFESSOR EHRENBERG, OF BERLIN.

ONE of the last acts of this Association, at its meeting at Washington, last May, was the adoption of a motion instructing the retiring President to send a letter of congratulation to Professor Christian Gottfried Ehrenberg, of Berlin, on the occasion of the fiftieth anniversary of his entrance into the medical profession. The undersigned is happy to state that this request was promptly complied with, as a copy of the communication hereunto annexed will serve to show. The letter was read at the meeting of the friends of the veteran naturalist and microscopist, and a printed copy sent to the author.

PHILADELPHIA, May 13, 1868.

HONORED AND DEAR SIR:

It was made my pleasing duty, as will appear by the accompanying communication, at the recent meeting of the American Medical Association at Washington City, to act as their organ in this correspondence.

A letter received from the Honorable Mr. Bancroft, our Minister at Berlin, conveys the gratifying intelligence that your friends and fellow-citizens, those who have longest and best known and appreciated your many excellent qualities both of head and heart, intend to unite next autumn in celebrating the fiftieth anniversary of your entrance into a profession which you have so much adorned and illustrated by your labors. Your fame as a great scientific discoverer and an indefatigable student of nature, has long been familiarly known in the United States, and has produced you numerous followers. In your hands microscopic researches first assumed a definite and distinct character, and revealed to the admiring gaze of the world many new fields of inquiry, since so successfully trodden by others. The infusoria, under the influence

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of your plastic genius, became for the first time in our knowledge a new link in the scale of animated beings, and a new source of wonder and admiration of that Great and Beneficent Being who holds the world in the hollow of His hand, and who is the creator alike of the smallest atom of matter, invisible to the unassisted eye, and of our glorious world, the abode of myriads of human beings.

Your name will ever be honored among men as the father of modern microscopy, and as one of the great naturalists of Germany in an age prolific in illustrious men. The microscope in your hands not only proved the existence of a large class of animals and plants before unknown, but paved the way for those gigantic discoveries which have been effected during the last third of a century in the structure of the human body, in health and disease, and which have shed such a flood of light upon the progress of the healing art. The researches of Schwann and Schleiden, of Virchow, of Robin, and of a thousand others, in the Old World as well as in the New, are traceable, either directly or indirectly, to your incessant labors, your boundless industry, and your wonderful powers of penetration, which have permitted nothing to escape you. The foundation which you laid in 1818, on the publication of your *Sylvæ Chycologicæ Berolinenses*, when you were hardly twenty-three years of age, afforded a promise of usefulness and distinction amply redeemed by your future. The novelty and minuteness of your researches, even at that early period of your life, astonished the scientific world.

The American Medical Association, whose organ I have the honor to be on this occasion, composed of eminent physicians from all parts of this vast continent, desire me to express to you their high appreciation of your scientific labors and of the esteem in which you are held by them as a man and a scholar. They hope that your precious life may be long spared, not only to your family and friends, but to the world, and that you may be enabled by your example to add increased lustre to the Prussian nation, which is so much indebted to you for its scientific renown.

I seize the occasion to express to you personally my high appreciation of your character, and to tender you my best wishes for your welfare and happiness.

Hoping that the approaching celebration of the semi-centennial anniversary of your professional career may, in all respects, be a

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most happy one, I am, honored and dear sir, very truly and cordially your friend and obedient servant,

S. D. GROSS, M. D., LL. D.,
President of the American Medical Association.

Professor CHRISTIAN GOTTFRIED EHRENBERG.

To this communication Professor Ehrenberg sent the subjoined reply, written in German. It is probable that the translation may not, in every instance, have caught the spirit of the original.

BERLIN, March 30, 1869.

MUCH HONORED PRESIDENT—

DEAR SIR: The congratulations sent to me by my professional brethren in North America, on the occasion of my fiftieth anniversary as physician, should have long since been acknowledged by me. It is true, already last year I requested Mr. Bancroft, your Minister at Berlin, to tender you my thanks, as it were in advance; but now that, fortunately, through the aid of the healing art and surgical science, my sight is so much improved as to enable me again to write a little, I hasten to send you, over my own signature, a few words of gratitude for your indulgent opinion of the doings of my life. Your whole fatherland, so full of liberal sentiments and fresh thoughts, I wish the ever-increasing success and strength befitting a great nation. May God bless all those who, by their profound researches, conducted in a spirit of dependence upon the Divine Being, join in the universal effort to obtain blossoms and fruit, though they should only be fully enjoyed by coming generations.

With grateful regards, I am your obedient servant,

DR. C. G. EHRENBERG.

To S. D. GROSS, M. D., LL. D.,
President of the American Medical Association.

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REPORT

OF THE

COMMITTEE ON PLAN FOR RELIEF OF WIDOWS AND ORPHANS OF MEDICAL MEN.

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REPORT OF THE COMMITTEE ON PLAN FOR RELIEF OF WIDOWS AND ORPHANS OF MEDICAL MEN.

NEW YORK CITY, April, 1869.

To the American Medical Association.

THE Committee appointed last year to present a Plan for the Relief of the Widows and Orphans of the Profession generally, are pleased to be able to present for the consideration of the Profession in every State, a method for the said purpose, which has proved, with several classes of citizens, a very useful, pleasant, easily managed, moderately expensive, and universally adapted system therefor.

The basis of the method referred to is that of *co-operative combination.*

The common method of life insurance which is for the benefit of heirs, and for which business companies are very numerously organized throughout the country, is a form well known to require very large annual premiums, and also restrictions of residence and travel, objectionable to very many persons.

The method recommended by this Committee for the interest of families of the medical profession, is clearly one which, if fully carried out, will benefit their heirs to a large extent, with very trifling expense. The idea is that of *purely mutual aid,* the only premiums required of each member being the assessment fee for donation to the heirs of deceased members. The frequency with which this contribution may be required will of course depend solely upon the rate of mortality of the associate members; and it is believed that in very few classes of people is this so low as in the medical profession. The annual rate of mortality of the ordinary population of large cities, and also in most other localities, is

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well known to be much greater than that of our profession. In the city of New York, the ratio in general is 25 to 30 per thousand, but of the medical profession the ratio is a great diminution thereof. In the nation generally it is doubtless much less than that.

With so moderate a requisition as this for the continuance of the organization, it is very clear that the larger the number of members in an association, the more liberal will be the assistance rendered the heirs, and the number of assessments required annually for the purpose will be very moderately increased by an enlargement of the number of members. Each organization should have at least 1000 members, and 2000 would furnish a more satisfactory allowance for the families of deceased members, without being very burdensome to the survivors.

The admission of members should of course be restricted to individuals actually engaged in practice, or as teachers in medical colleges, a circumstance indicative of good health in general, and be confined also to the regular and honorable branch of the profession.

Another interesting question in relation thereto, is the *age* of practitioners who may desire connection with such an organization, and with regard to this peculiar form of association, composed wholly of our professional brethren, there is a special reason for a more liberal consideration than is generally granted by other classes of people.

A certain article of the Code of Ethics, referring to the *Duties of Physicians to each other, and to the Profession at large*, presents a consideration on this special point. Thus we are told, "every individual should entertain a due respect for his seniors, who have by their labors brought it to the elevated condition in which he finds it."

In illustration of the practical mode of organizing associations for this purpose, there is herewith presented a copy of the constitution of one, entitled *The New York Physicians' Mutual Aid Association*, which has been nearly one year in operation, and is attracting much attention. Its membership residences embrace five counties only, but the aggregate population of these counties is greater than the average population of the several States of the Union.

In each of the others, either the entire State, or a large portion may be appropriately included in one association—or the separate, counties thereof may constitute branch organizations thereof.

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For full details concerning the rate of assessments, initiation fees, form of constitution, etc., see the printed copy of the Constitution and By-laws of the New York Physicians' Mutual Aid Association appended to this report.

Respectfully submitted,

JOHN H. GRISCOM,
ALBERT C. POST,
N. S. DAVIS.

CONSTITUTION AND BY-LAWS.

ARTICLE I.—TITLE.

THE title of this Association shall be, "THE NEW YORK PHYSICIANS' MUTUAL AID ASSOCIATION."

II.—OBJECT.

The object of the Association shall be, to afford relief to the heirs of its deceased members by such contributions as may be required by the regulations of the Constitution.

III.—OFFICERS.

The officers of the Association shall be, a President, two Vice-Presidents, a Recording and an Assistant Secretary, a Treasurer, and a Corresponding Secretary, all of whom, with nine Directors, shall constitute a Board of Trustees. The Directors shall be divided into three classes of three each; one class to be elected in place of the one retiring each year. The President, Vice-Presidents, Secretaries, Treasurer, and three Directors shall be elected annually, on the first Saturday of November of each year, and shall hold office until their successors are duly elected.

All elections shall be by ballot, and a majority shall be necessary to a choice.

IV.—MEMBERSHIP.

Any regular member of the Medical profession of the Counties of New York, King's, Queen's, Richmond and Westchester, in good health and in actual practice, or teacher or professor in a Medical

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school, under seventy years of age, may be admitted a member of this Association by five (5) affirmative votes of the Trustees, by ballot, on paying an initiation fee of two (2) dollars, and a first assessment as provided by Article V., and signing the Constitution, or a voucher to that effect, which shall be put on file, and his name recorded by the Treasurer in a book containing the Constitution.

Each applicant for admission shall fill up and sign a blank furnished by the Association for that purpose, and his application be satisfactorily vouched for as to his professional standing and health.

All applications shall be sent to the Recording Secretary of the Association.

V.—Assessments.

The Treasurer, upon being informed of the death of any member, shall immediately notify all the other members, and require of each the following payments, viz.: one (1) dollar from those admitted *under* fifty (50) years of age, and two (2) dollars from those admitted *over* fifty (50) years of age.

§ 2. All assessments after the first must be paid within thirty (30) days after the notification of the death of the last deceased member, under the penalty of forfeiture of membership. The heirs or legal representatives of a deceased member are required to notify the Recording Secretary of the Association of such death within ten (10) days, or as soon thereafter as practicable, such notification to be accompanied with satisfactory vouchers.

§ 3. All assessments collected according to Article V. shall be paid to the legal representatives of the deceased; and if not claimed by the heirs at the expiration of twelve (12) months, shall be placed to the credit of a Permanent Fund.

§ 4. For all expenses incurred by the officers of the Association in the transaction of its legitimate business, if there is at any time an insufficient amount derived from the initiation fees, the amount necessary to make up the deficiency may be deducted from the assessment received for the benefit of the heirs of each decedent, but not to exceed five per cent.

§ 5. For any surplus assessment not less than twenty-five dollars, paid by a member in anticipation of the requirements of Article V., the interest thereof derived from a Savings Bank shall be credited to its contributor; and in case of his decease before it is all appropriated to the heirs of other members, the amount remaining shall be paid to his heirs or legal representatives, unless directed by the contributor thereof to remain in possession of the Association, in which case such balance shall be devoted to the creation of a Permanent Fund.

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VI.—Board of Trustees.

The Board of Trustees shall meet monthly, at such time and place as they may elect.

Special meetings may be called by the Chairman, or on written requisition of three Trustees, stating the object. Nine members shall constitute a quorum.

The Trustees shall transact the ordinary business, and take a general supervision of the Association; fill all vacancies until the next annual election, and admit to membership. They shall present a full and detailed report to the Association at its annual meeting; they shall investigate all charges of moral or professional delinquency, and submit the result of such investigation to the Association at the first regular or special meeting. They shall also audit the accounts of the Treasurer for the annual meeting.

VII.—President.

The President shall preside at the meetings of the Association, and perform the ordinary and such other duties as may be required of him. In his absence, a Vice-President shall take his place. He shall also be the chairman of the Board of Trustees.

VIII.—Recording Secretary.

The Recording Secretary shall make and keep correct minutes of the proceedings of the Association and of the Board of Trustees. He shall present applications for membership to the Trustees. He shall promptly notify all Committees of their appointment, and the matters referred to them; also those admitted to membership. He shall also, without delay, notify the families of deceased members of their claims on the Association.

IX.—Assistant Secretary.

The Assistant Secretary shall issue all notices for meetings, giving three days' for the Trustees, and for the Association five days', and for all proposed constitutional amendments ten days' notice.

X.—Corresponding Secretary.

The Corresponding Secretary shall conduct all the correspondence of the Board of Trustees and of the Association not otherwise provided for. He shall supply all applicants with the blank form for admission, and such other information as may be requested.

XI.—Treasurer.

The Treasurer shall receive and have the custody of all moneys of the Association. He shall pay no bills nor dues to the heirs of

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deceased members, unless previously ordered by the Trustees and indorsed by the Chairman. He shall report to the Trustees at their regular meetings, and also make an annual report to the Association. He shall send each individual admitted his certificate of membership, as soon as he shall have complied with the necessary requirements. (See Article IV.)

Upon being informed of the death of any member, he shall immediately notify the others thereof by mail, and call for the assessments in advance, as per Article V. He shall notify delinquents of the non-payment of their assessments, and if the same be not paid within fifteen days thereafter, he shall report them to the Trustees.

He shall deposit in a Savings Bank or Trust Company, at interest, all sums *over* fifty dollars, which may at any time remain in his hands, not otherwise appropriated; such funds to go toward the formation of a Permanent Fund. His books, papers, funds, and all properties belonging to the Association, also such as may be in the possession of any other officer or member, shall be subject to the control of the Trustees or the Association. All bank checks shall be drawn to the order of and indorsed by the President.

XII.—Meetings.

The annual meetings shall be held on the first Saturday of November of each year, when the annual report shall be submitted, officers elected, and such other business transacted as may be introduced.

Special meetings may be called by a requisition, in writing, upon the President, by ten (10) members, or by five votes of the Board of Trustees. Fifteen (15) members shall constitute a quorum.

XIII.—Permanent Fund.

All invested funds, with the interest thereon, shall remain, with such other additions as may accrue from time to time from initiation fees, interest, forfeitures, or otherwise, until the same shall amount to five hundred (500) dollars; after which the interest thereof may be devoted to the heirs of such deceased members as the Trustees may direct.

XIV.—Discipline.

The Association reserves to itself the right and power to strike from its roll, for adequate cause, any member, thereby depriving him of any and all his previous interest in the Association, which shall require a two-thirds vote of the members present, at a meeting of not less than fifty (50) members.

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XV.—Order of Business of the Trustees.

1. Reading of the minutes of the preceding meetings. 2. Report of the Treasurer. 3. The reception of applications for membership. 4. Vote on the same. 5. Correspondence. 6. Report of Committees. 7. Unfinished Business. 8. New Business. 9. Adjournment.

At the Annual Meeting of the Association: 1. Reception of the Report of the Trustees. 2. Report of Committees. 3. Unfinished Business. 4. Election of Officers. 5. New Business. 6. Adjournment.

The call for the yeas, and nays shall be, in the Trustees, by two members, and in the Association five members, to be taken without debate, and recorded in the minutes.

The ordinary parliamentary rules to be observed.

The Association shall approve its minutes before it adjourns.

XVI.—Amendments.

This Constitution may be amended at a stated meeting of the Association, by a vote of three-fourths of the members present, such proposed amendment having been submitted to the members by a notice ten days previous to the meeting.

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REPORT

OF THE

COMMITTEE ON SPECIALTIES;

AND ON

THE PROPRIETY OF SPECIALISTS ADVERTISING.

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REPORT OF THE COMMITTEE ON SPECIALTIES, AND ON THE PROPRIETY OF SPECIALISTS ADVERTISING.

THE Committee on Specialties find that the subject has been several times fully discussed before this Association, and believe that any extended remarks are now unnecessary, as its merits have been sufficiently canvassed, more particularly in the address of Dr. D. Humphreys Storer, President of the Association in 1866, the "Report of the Committee of Medical Ethics on Specialties" for the same year, and at the meeting in Cincinnati in 1867.

But although much interest has been shown in the discussion upon either side, the Association has heretofore refused to take any action upon the questions involved; and the Committee think that this delay is now operating injuriously upon the profession, and that the time has come when it is the duty of this body to give some expression of its views. At present there is great uncertainty prevailing in the minds of the profession as to the proper relations of special to general practice, and as to the privilege of specialists advertising. In consequence of this an inequality results in practice, the one party contending for a strict interpretation of Art. I. Sec. 3, "Duties of physicians to each other," of the Code of Ethics; while the other treat it as a mere "dead letter," without further force or meaning, and advertise with impunity.

The Committee, however, propose to deal with the question only in its general bearings, and to be brief in its discussion.

As to the advantages of specialties to the *science* of medicine there can be but one opinion; that "division of labor," that has accomplished so much in the history of all the other sciences, must give like results in the broad field of medicine; and, indeed, it has already been demonstrated in ophthalmology, in uterine surgery, in the researches of Dr. Brown-Séquard, and others in neuropathy, that the cultivation of these branches can best be accomplished by

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a special devotion to one of them, by such as have become proficient in general medicine.

While all may agree, however, that specialism is of advantage to the *science*, there is great diversity of opinion as to its benefits to the *profession*. The chief objection brought against specialties is, that they operate unfairly toward the general practitioner, in implying that he is incompetent to properly treat certain classes of diseases, and narrowing his field of practice. This can only be in the cities and large centres of population, for there only can specialties find support, and in them the general practitioner is amply recompensed by having entire control of all those classes of disease in which the specialists cannot compete. It is natural that in any change from old-beaten paths, there should be some temporary confusion, but it is thought that as soon as the relations between special and general practice become better adjusted, and they settle down into their appropriate spheres of work, as they shortly will do, great advantage will accrue, even to the general practitioner; the number of his patients, and the amount of his work will not be diminished, but his practice will only be circumscribed in the *variety* of his cases. The Committee, therefore, are of the opinion that specialties are destined not only to advance the science of medicine, but to elevate and improve the profession; and they think it due, both to them and the public, that this Association—known as the highest medical authority of the country—should give them its official sanction.

The Committee do not propose to define what should be the limits of specialism, or to advise any new plan for the establishment of harmonious relations between the special and general practitioner. They think all that it is necessary or proper for this Association to do, is to place them upon an equal footing, to require that they both hold to a rigid observance of the general laws of professional courtesy and etiquette which have hitherto governed us, and leaving them to adjust themselves in their details, under the established Code.

If specialists would be content to work upon this broad common ground with the rest of the profession, the Committee are of opinion that all the evils now complained of would speedily disappear; but unfortunately they have shown a tendency to exceed their natural boundaries within the code of ethical obligations, and to assume to themselves the privilege of advertising, and appealing to

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the public for that support which only a faithful apprenticeship and work should bring.

The Committee think that this great evil should be corrected. They cannot see the justice of permitting the specialist to advertise, while withholding the privilege from the general practitioner. If a man become proficient in any special branch, there is no danger that his merits will not be recognized both by the profession and the public. If his success is to depend on advertising, it will soon result that he who advertises most freely and immodestly will outstrip his competitors, and notoriety become synonymous with reputation.

The Ophthalmological Society has adopted a resolution refusing to sanction this use of the weapons of quackery to its members, and your Committee think the same stand should be taken by this Association in reference to all specialties. The appended resolutions are respectfully offered as embodying the views above expressed.

E. LOYD HOWARD, *Chairman.*
CHRISTOPHER JOHNSTON.

Resolved, That this Association recognizes specialties as proper and legitimate fields of practice.

Resolved, That specialists shall be governed by the same rules of professional etiquette, as have been laid down for general practitioners.

Resolved, That it shall not be proper for specialists publicly to advertise themselves as such, or to assume any title not specially granted by a regularly chartered college.

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REPORT

ON THE

PRACTICABILITY OF ESTABLISHING A LIBRARY OF AMERICAN MEDICAL WORKS.

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REPORT ON THE PRACTICABILITY OF ESTABLISHING A LIBRARY OF AMERICAN MEDICAL WORKS.

YOUR Committee appointed "to report at the next (this) session on the practicability of establishing a library of American medical works, including books, monographs, and periodicals," have had the subject under consideration, and beg leave to submit the following report:—

After carefully viewing the project in all the relations in which it has presented itself to us, we deem it not only practicable but exceedingly desirable that a library of the character suggested be established under the auspices of the American Medical Association, and commend the measure to the patronage of the medical profession of the United States.

The value of books to the medical man cannot be over estimated. They are the inexhaustible fount of knowledge from which the discoveries of the day, and the accumulated experience of ages may be drawn.

The physician whose studies lead him to consult early American medical literature must be painfully struck with the perishable character of our professional literature, and the meagre or fragmentary collections which have been made.

There is no city or library in our country that can boast of anything like completeness in the works of American authors. Indeed, it is to be feared that the combined collections of all the libraries in the country would not now produce a complete list of the various contributions to the science of medicine by local practitioners since the settlement of this continent.

It is to be hoped that national pride will, in this direction, aid our professional requirements, and that this body may, at its present session, inaugurate measures that will lay the foundation of a great national medical library, or repository of all American medical works, including books, pamphlets, periodicals, journals, transac-

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tions, reports, addresses, circulars, catalogues, etc., that are in any way connected with the history and practice of medicine, and such other medical works as may be contributed to the collection.

Much of the material that is desirable for such a library, and which is so intimately connected with the most interesting period in the history of the medical profession in America, is now almost irrevocably lost, and further delay but adds to the danger of its complete destruction, or enhances the difficulty of recovering copies for preservation. We should aim to make the collection absolutely complete in all that has been contributed to the literature of medicine by American physicians, from the settlement of the country to the present time.

Such a collection would interest the whole medical profession, and the inquisitive, not less than the curious student of our own and foreign countries.

It is true some of our cities have extensive and valuable public and private medical libraries, but they are, as a matter of course, local, and more or less exclusive in their character and benefits. A national medical library would not antagonize or in the least interfere with these.

The proposed library, if successful, must be constantly increasing in extent and value, and be at all times free for consultation to the whole profession.

Your Committee construe their duty to report "on the practicability of establishing a library of American medical works" to include also suggestions as to the steps necessary to be taken to effect the object, the location of the library, and the preservation of the collection. The desirableness of the measure seems to have been conceded by the passage of the resolution.

The necessity for establishing such a library will be apparent to any person who considers the importance of preserving our national medical literature, or attaches that value to books which the enlightenment of the age and the progress of science demand. We are persuaded that a library of the character suggested would greatly increase the reputation and usefulness of the Association, and considering the fact that this body is gradually tending to localize its sessions in the Federal City, we, therefore, deem *that* the most desirable place for its location. Eminent talent is yearly attracted to our national capital, which has a central position, and embodiment of political power and a population that makes it peculiarly attractive to persons of leisure with scientific proclivities.

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Here too are centring, in public institutions, and in private hands, the choicest collections in art, and the treasures of natural science in our country. Universities, colleges, institutes, and departments for teaching are multiplying and developing their powers here under the sanction and presence of the leading statesmen and scholars of the country.

Being the political centre of America, and much of the time the home of the representatives of the people, selected as national legislators, the country has become accustomed to look to Washington to discover the current of public opinion. This fact has become so fully recognized that many associations that are national in their character, hold their conventions here, as the best point from which to influence public opinion.

Assuming the desirableness and practicability of establishing a national medical library to be generally recognized by the profession, and its location approved, how, it may be asked, is a collection of books, such as indicated, to be obtained and brought together? In answer to this pertinent and very important question, we beg leave to present the following plan as seeming to us the most feasible.

First. Let the American Medical Association, by resolution, affirm its purpose to found a library of American medical literature, and request for it contributions of books, pamphlets, periodicals, and money, from the profession of the United States, for whose benefit the collection is designed.

Second. Let the Association, by resolution, request every American medical author *or* publisher now living to present a copy of all their medical publications to the library of the American Medical Association, to be preserved and catalogued with the name of the donor and kept in condition to be readily consulted.

Third. Let the Association request, by resolution, physicians and others throughout the United States having duplicate copies of early American medical publications that are scarce and out of print to present a copy to the library, to be catalogued with the name of the donor and preserved for reference.

Fourth. Let the Association place annually a small sum, say one or two hundred dollars, at the disposal of the librarian to invest as opportunity may offer in books of the character indicated, and to pay postage, expenses of packages, etc.

Fifth. Let the Association instruct the Librarian to exchange, at a fair valuation, as opportunity may offer, such duplicates as

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may accumulate in the library for desirable works not in the collection, and to report yearly to the Association the expenses, and the annual increase and condition of the library.

Sixth. A book-mark, engraved or printed, should be adopted, which would display prominently the name of the Library of the American Medical Association, having on it a blank for the insertion of the name of the donor, and the number of the volume. One of these should be pasted on the inside of the cover of each book, as evidence of ownership and protection against loss.

We have been assured by authors and publishers in different parts of the country that they heartily approve the project, and will cheerfully contribute complete sets of their works and journals if the library be started under the auspices of the American Medical Association and is designed to be permanent.

The wisdom and professional ability that have characterized the labors of this Association, from its formation in 1846 to the present, have secured for it a reputation second to no medical organization in the world.

It therefore seems to us that the influence of this body aided by the co-operation of the profession of the country would in a very few years collect a most choice library, measurably complete in American medical literature of inestimable value to the profession, and that will be yearly increasing in extent and usefulness.

When the library is opened and its purposes better known, large and valuable contributions, we feel confident, will be made to it from time to time by physicians in advanced life and by those who have made special collections for particular studies, when they have served their purpose, rather than have them scattered under the auctioneer's hammer.

The subject of properly caring for such a collection of valuable and, in many instances, of unique copies of books has been considered, and two permanently established libraries have been consulted both of which have made propositions to accept the trust.

The first is by the Medical Society of the District of Columbia, an institution chartered by Congress more than half a century ago, and to which all the regular practitioners of the District of Columbia belong. This society has recently erected a commodious Hall and Library Room for its own accommodation in a central part of the city, which is deemed reasonably secure against acci. dents by fire, and believing that they might accept the charge of, catalogue, and keep all the works collected by the American Medi-

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cal Association in a condition to be consulted, a note of inquiry was addressed to that body upon the subject, a copy of which, marked A, accompanies this report, to which the following reply was received.

WASHINGTON, D.C., April 7th, 1869.

J. M. TONER, M. D.,

Chairman of Committee on Library of the American Medical Association.

SIR: At a meeting of the Medical Society of the District of Columbia, held on this day, the following report was made by a committee to whom the subject was referred.

To the Medical Society of the District of Columbia. Your Committee, to whom was referred the letter from Dr. J. M. TONER, Chairman of a special Committee of the American Medical Association, to this Society, inquiring upon what condition it would accept the care of, the cataloguing and keeping in condition to be readily consulted, a Library of American medical works, which that Association is considering the practicability of collecting, have had the question under consideration, and would beg leave to report, making the following recommendation.

That in view of the probable formation of a Library of American medical works in this city by the American Medical Association:

Resolved, That the Medical Society of the District of Columbia will cheerfully accept the custody of any collection of books the American Medical Association may make, and keep them securely in their Library and in condition to be readily consulted.

THOMAS ANTISEL, M. D.,
JOS. M. TONER, M. D.,
J. W. H. LOVEJOY, M. D.,
Committee.

The report was accepted, and the recommendation of the committee approved and adopted by the Society, and I have been instructed to inform you of its action.

I have the honor to be, very respectfully, your obedient servant.

J. W. H. LOVEJOY,
Corresponding Secretary Medical Society of D. C.

That nothing might seem to be wanting on our part to secure for the collection such a recognized safe lodgment and supervision as would give satisfaction and encourage contributions, a note was addressed to the Librarian of Congress inquiring if that Library

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would consent to receive the books and pamphlets that might be collected by the American Medical Association, as a special deposit. A copy of the note accompanies this report, and is marked B. To this Mr. Spofford, the Librarian, replied as follows:—

WASHINGTON, D. C., April 3d, 1869.

J. M. TONER, M. D.

Chairman of Library Committee American Medical Association.

DEAR SIR: Your communication of the 31st of March, asking whether the Library of Congress would receive as a special deposit a collection of medical books, which would be the property of your Association, has been received and duly considered.

So far as I am able to act in the premises, I should heartily welcome such an accession to the stores of the National Library, provided the books were of the nature of a public deposit, and, therefore, available for the consultation of readers in the Library. The fact that there is already a collection of over 6000 volumes of works relating to medical science here, adds to the importance of your enterprise, which, as I understand, contemplates the gathering into a central and fire-proof repository, all the stores of early medical books and pamphlets which the liberal contributions of members of your Association and of the public may bring together. This may justly be considered as an object of national importance, aside from its professional value to your Association; and I know of no other method so likely to accumulate the early pamphlets and books relating to medical science into a comprehensive library for universal public reference, as the zealous co-operation of the members of your Association towards the completion of such a collection.

It would give me pleasure to set apart an alcove in the medical department of this Library, which, with its present accumulation of 176,000 volumes, is a literary repository worthy of the American people, whose contributions it represents, for your collection. I would suggest that each book should have a distinctive label, printed for the purpose, and identifying it as the property of your Association. I have no doubt that the Joint Library Committee of Congress would concur in such regulations as might be agreed upon relating to the reception and care of this special collection.

With high respect, your obedient servant.

A. R. SPOFFORD,
Librarian.

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Either of the Libraries named offers the security and facility of access deemed requisite; we, therefore, recommend that this scheme here set forth for collecting a Library of American medical works be approved, and that the offer of one or the other of the Libraries named be accepted and made a repository, and the task commenced of bringing together under the auspices of this Association as complete a collection of American medical literature as national pride and professional zeal may be able to accomplish.

Respectfully submitted,

J. M. TONER, M.D.,
N. S. DAVIS, M. D.,
D. FRANCIS CONDIE, M. D.

A.

WASHINGTON, D. C., April 7, 1869.

THOMAS MILLER, M. D.

President of the Medical Society of the District of Columbia.

DEAR SIR: As a member of a special committee of the American Medical Association to report "on the practicability of establishing a Library of American medical works, including monographs and periodicals" at its next session, we are now soliciting suggestions and collecting facts to enable the Committee to discharge their duty.

The measure seems practicable, but it is extremely important to fix upon a practicable mode of preserving the collection and keeping it in condition to be accessible for reference. The liberality of this Society, and the ample capacity of its Library Room, has suggested to my mind the possibility that the Medical Society of the District of Columbia might extend the desired facilities to the American Medical Association, and to the end of asserting in an authoritative manner whether, and to what extent, the Society would give accommodation and assume the responsibility and care of such a collection is the purpose of this note.

With the greatest respect, I remain yours,

J. M. TONER,
Chairman of the Committee, American Medical Association.

B.

WASHINGTON, D. C., March 26, 1869.

A. R. SPOFFORD, Esq.,

Librarian of the Library of Congress.

The American Medical Association, at its twenty-first annual meeting, held in May last, appointed a committee of three, con-

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sisting of Drs. J. M. Toner, of the D. C., N. S. Davis, of Ill., and D. F. Condie, of Pa.," to report at the next session of the Association which meets on the 4th day of May next, "on the practicability of establishing a library of American medical works, including books, monographs, and periodicals," to be located in this city.

I have already conferred with the gentlemen named with me on the Committee. They approve of the project, and desire me to prepare a report recommending the measure, and with the outline of a plan to commence the collection of the library at once under the auspices of the American Medical Association, which is rapidly tending to localize its sessions in this city; holding, as it now does, every alternate one here.

The project is new, and as yet has not been discussed in the Association, but it will be a success if it receives the hearty support of the profession. The correspondence I have had so far leads me to be very hopeful, if not confident, of its success.

A difficulty presents itself to me as to the mode of caring for such a library. The Medical Society of this city has just completed a hall and library room, and would cheerfully assume control of all the works collected by the American Medical Association, and keep them in a condition to be readily consulted. But lest an objection might be raised in the convention, that would defeat the measure almost in its inception, that we have not a fire-proof building to keep safely such a collection, therefore the measure had better be deferred as physicians having copies of rare and early medical works would not feel like parting with them unless they were placed in a fire-proof repository.

To anticipate and have an answer to such an objection I have thought well to address a note to you to see if you would not consent to receive any collection the American Medical Association may make as a special deposit, catalogue and keep them in a condition to be readily consulted.

The Association would have one of their members, at this point, act as an agent or Librarian to receive packages, pay all expenses, and hand the books over to you free of all costs.

The Association meets once a year, about the 1st of May, when it is supposed they would expect a report of the condition and yearly increase of the library.

Hoping you may be able to grant the above request,

I remain yours, very respectfully,

J. M. TONER,

Chairman of the Committee, American Medical Association.

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REPORT

OF THE

COMMITTEE ON MEDICAL EDUCATION.

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REPORT OF THE COMMITTEE ON MEDICAL EDUCATION.

YOUR Committee on Medical Education would respectfully represent that they enter upon the discharge of the duties which devolve upon them with no little misgiving and distrust. The subject has been under the consideration of this Association from the beginning of its existence; it has always occupied a prominent place in its deliberations; it has been committed to the hands of some of its ablest men, and numerous reports have been presented, worthy of their authors, of the Association, and of the important interests involved. In these reports almost every question relating to the subject has received attention: the deplorable condition into which the profession has fallen; the entire absence of any requirements as to the preliminary education of the student; the low standard of graduation; the absurd mode of teaching by a large number of lectures crowded into a short space of time; the general lack of clinical instruction; the absence from the curriculum of many subjects of great importance; the necessity for some supervision of the graduating power; all these points have been again and again urged upon your attention, while the more thorough and extended courses of study and the repeated and strict examinations of foreign countries have been detailed for comparison and presented as models, for at least partial imitation. Under these circumstances we feel that there is little new to present upon the subject, and little of the old which can be more strongly urged than has already been done. The truth is nearly stated in the words of a preceding committee: "The whole system of medical education has been so strongly analyzed, and so completely presented to this body in all its details, that an extended examination of the subject by any subsequent committee would seem but a work of supererogation."[1]

[1] Report of 1858; Jas. R. Wood, M. D., Chairman.

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Nevertheless, with advancing years, the aspect of the subject changes, and there may be something in the present juncture of affairs justifying another report upon a matter so often considered as to have become wearisome. We believe this to be the case; that the present time is likely to prove a critical period in the history of reform in medical education; that at this time decided steps will be taken to insure future progress, or the subject will lapse into a condition of hopeless neglect. This conviction is derived from a consideration of the recent action of the Association, and of the situation of the subject brought about by that action, which will be now briefly detailed. At the session held at Baltimore in 1866, a call was issued for a convention of the medical schools and colleges of the country, for the purpose of revising the system of medical instruction; in this call all former action of this body may be said to have culminated, and it justly forms a new starting-point from which to examine the subject. The convention was held at Cincinnati in 1867; it was composed of delegates from eighteen institutions—"A majority of all the regular medical colleges in our country, embracing some of the oldest and most influential educational institutions belonging to the profession, and in location embracing the whole breadth of our country from the Atlantic to the Pacific." After careful consideration and full debate, that Convention of Medical schools adopted five distinct propositions which may be briefly stated as follows:—

1. The requirement of a certain amount of preliminary education to be made when the student matriculates at a medical college.

2. An extension of the period of study to four years, with three courses of lectures.

3. An extension of the lecture term to six months.

4. An increase of the curriculum with a provision for grading the students into classes according to the year of study, with an examination at the close of each year.

5. Actual attendance upon lectures to be ascertained.

The report of the Convention was presented to this Association and immediately adopted. The proceedings for 1867 show that a resolution was unanimously passed, "cordially approving" the action of the Convention, and urging the practical adoption of its plan, as set forth in the above five propositions, upon all the medical colleges of the country.

Now, then, the long anticipated point seemed to have been reached; the action of the Convention was satisfactory to the most

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ardent friends of educational reform, and they congratulated themselves upon a speedy realization of long-cherished hopes. But they were doomed to disappointment. At the very next meeting of the Association, held at Washington last year, and before time enough had elapsed to allow the plan of the Convention of schools to be carried into effect, the following resolutions, introduced by a gentleman connected with a medical school, were adopted:—

Resolved, that the American Medical Association refers the whole subject of medical education to the faculties of the regular medical colleges of the nation, pledging itself to adopt and enforce any system or plan that may be agreed upon by two-thirds of all recognized medical colleges.

Resolved, that this resolution be referred to the committee already acting in this matter, and they are requested to report within two years from this session.

These resolutions were passed without much debate, and in the opinion of your Committee, the action they embody was not only hasty, but most unfortunate. It undoes a considerable amount of work which had been accomplished, placing the subject back where it was before the convention of schools had been held; it destroys a fixed plan, and gives nothing in its stead; it takes away from this Association a position of authority it had gained, and upon which it was sustained by the very support most needed, that of the medical schools, and it leaves everything as before, without fixed order, and without a definite power to direct or control.

It will be seen then that this Association and the profession are awaiting the action of a committee whose report is to be presented within another year; while that action is pending, it is possible that some influence may be exercised upon it, and this thought alone is the justification your Committee would present for offering another report upon a subject concerning which so much has been written, and so little done. In this connection, however, we cannot refrain from most respectfully but most earnestly inquiring what the "medical colleges of the nation" have done in the past to entitle them to the confidence of the profession in this matter for the future; and to justify them in asking that this momentous interest be again committed to their keeping? For twenty years it has been in their hands or entirely at their command; for twenty years the subject has been agitated, and the necessity for reform set forth by this Association, by State societies, and by medical journals. Any five years of that time would have sufficed for every change

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to have been made, had the schools, as a body, so willed it. Had even a majority of them united upon propositions similar to those of the Convention of 1867, taken a firm stand, and appealed to this body and to the profession at large to sustain them against the minority, which might have proved factious, they would have been sustained, and the whole subject would long since have been disposed of. There cannot be found, then, in the opinion of your Committee, anything in the past action of the schools which warranted this Association in again committing the subject to their keeping, especially since, by doing so, vantage ground already gained was abandoned.

In entering more directly upon the consideration of the subject committed to our care, we will spend no time in the ungracious task of exposing the necessity for reform. It is well known that hundreds of young men annually go out from our colleges to the solemn responsibilities of practice most lamentably unprepared; and equally well known that the mere fact of graduation is not a guarantee of proper preparation. We will only refer for proof, if it be needed, to reports presented by preceding committees; some of these, emanating from men of high standing as teachers, can neither be gainsaid, nor the unpleasant truths they contain be attributed to wrong motives or a desire to "make out a case." Nor will we stop to inquire as to where the blame for the present unhappy state of affairs should be chiefly laid. It must undoubtedly be divided between the practitioner who first receives a youth who is unfitted by nature or by training for becoming a student, and the college which turns him out with a guarantee that he is worthy and well qualified, when he is neither; but in what proportion it should be divided we will not attempt here to determine. We would rather address ourselves to the task of trying to show how the present evils may be corrected or removed, and in doing so, will first lay down a few general propositions which have not been hastily adopted, and for which we claim your respectful consideration.

All measures of reform must proceed from, and be carried out by the profession itself. We believe this to be evident; if its truth be not admitted a moment's consideration will make it apparent. The spirit of our institutions is hostile to that interference by the government, which in other countries regulates educational as well as all other matters pertaining to the public welfare. Legislative

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assemblies are imbued with the popular idea that the legal prescription of a certain mode of study for the people's doctors is a restriction of the liberty of choice of a medical adviser, and a violation of the principle that there shall be no class especially favored by legislation. That this is a false idea does not affect its strength. The State passes laws regulating insurance, banking, and trust companies; prescribes that certain articles shall only be bought and sold in certain ways, and in other modes interferes to protect its citizens from loss and wrong where the matters dealt with are beyond the range of ordinary intelligence. No complaint is made of these things, but the moment an attempt is made to protect the public from the ravages of impostors or the blunders of ignorance, the cry of class legislation is raised, and the attempt frustrated.

Should a lingering doubt remain in the minds of any upon this point, we believe it will be dispelled by the history of a late effort to obtain legislative interference of this kind in a single State. In the winter of 1866–7 a bill was introduced in the legislature of Ohio, under the influence of the Surgeon-General of the State, to regulate the practice of medicine. It required an examination by a committee of the State Medical Society, preliminary graduation being requisite for appearance before the board of examiners. That there might be as little objection as possible to the bill, provision was made that those already in practice should not be interfered with, and that no examination should be held upon the disputed subjects of therapeutics and materia medica. This bill did not get a respectable vote; all sects in medicine united against it, and even the regular profession did not heartily and unitedly support it. During the following winter, another attempt was made; a bill was introduced, making it illegal to practise medicine without a diploma from some "legal" medical college. As the State had chartered and there were in active operation within her borders, a homœopathic, an eclectic and physico-vital college (whatever that may be!) it was thought no possible objection could be urged against so necessary a measure. Yet before its passage an amendment was attached to it making a certificate from *any* county medical society a license to practise, and therefore almost entirely destroying its vitality! Now, when it is considered that before anything like unity of action can be reached in this matter, some twenty or thirty different legislative bodies must be brought to agree upon the same measures, the utter hopelessness of aid from this quarter is apparent. Nor is anything more to be expected

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from public opinion; our power of influencing it is extremely limited. Nor does the public care much for distinctions between different kinds of doctors. All sorts of institutions are empowered by law to grant the degree of doctor of medicine; therefore, in the public eye, all are alike. The standard for graduation has been so lowered in our own schools that the degree had ceased to be a distinguishing mark of superior qualifications, and it has become impossible for the public to distinguish except by individual characteristics. Your Committee feel, therefore, that they cannot too strongly impress the truth that the regeneration of the profession must come from the profession itself. It must so guard the entrance to it, as to prevent grossly incompetent men from joining its ranks; it must so increase the value of the diploma, as to make it a prize worth striving for, and an evidence of acquirements worth possessing; the difference between the graduates of regular colleges, and the offspring of one-idea institutions, however "legal" they may be, must be apparent to the public eye. As in the living body under the influence of a presiding and regulating nervous system, healthy particles are assimilated, and noxious ones rejected or cast out, and thus the health of the whole maintained, so the profession must by organization act upon its individual members, and as it influences them will it stand or fall in public estimation.

Changes must be made slowly, and progress can only be gradual. A slow rate of progress is a general characteristic of all healthy reforms which affect large numbers or great interests, and we believe nothing can be found in the subject under consideration to affect the general rule. In order to bring the matter and manner of medical education up to the desired point, a large number of institutions situated in a very wide space of territory are to be brought into harmonized action, and to produce this harmony pecuniary interest will sometimes be affected; the individual practitioners of the country must be awakened to their duty and their power in bringing about a different state of affairs; these things will take time, and we believe that both institutions and individuals are more likely to make progress, if but a step or two be required at a time, for we cannot escape the conviction that one reason for the want of effect of the recommendations of committees of this Association is to be found in the fact that the plans presented have been generally sweeping and revolutionary in character. In regard to all plans for progress designed to be general, we believe the peculiar condition of our country should always be considered. Along the

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seaboard we have an old settled section, with large and prosperous cities, where wealth abounds, and culture is general; as we pass over the middle portion and towards the west, the condition gradually changes until we find a newly-settled region where man is yet engaged in subduing the forest or breaking the prairie. Now requirements as to professional education which would be far from too stringent in one section, where educational opportunities abound, would be so in the other, where the boy had but little time for school and the young man has but little for professional study. If the standard be placed at once too high, the effect in the less forward sections will be not to bring the student up to it, but to cause him to begin practice without any reference to any standard —doing so as soon as he finds himself competent to dispense a few medicines and believes himself able to treat the most common diseases. This is now so frequently the course followed, especially in the western portion of our country, that your Committee cannot but look upon it as a great and crying evil; it is one, too, which has never before been brought to your notice; they would therefore especially call attention to

The necessity for some action by this body in regard to those who enter upon the practice without graduation. We have said that this evil is of great magnitude; we think we hazard nothing in saying that in some sections it is the rule, rather than the exception thus to begin professional life. In one county, for instance—the residence of one of your Committee—a county which ranks third or fourth as to population and wealth in the State, there are no less than eight such practitioners, and they command the major part of the practice outside the towns. It is worthy of note, too, that six of these went from the office and began practice under the patronage of one man—a striking instance of the baneful influence a single individual may exert! That this evil should be corrected requires no proof; the interests of the profession at large demand that these men should fully prepare themselves or be cut off from affiliation with it, for the character of the whole body suffers from their connection with it; it is demanded by the interests of those who have spent time and money to regularly qualify themselves, and it is due to the schools that those who enter the profession and share its emoluments should be compelled to pass through the portals of some educational institution. The Committee on the Convention of Schools, in its report, alludes to this evil, which it justly terms "a most pernicious practice," and

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expresses the belief that an "effectual stop" would be put to it by the adoption of the five propositions agreed upon. As no reasons are given, however, for that belief, we feel compelled to differ, and to express the conviction, that the only remedy is found in the decided action of this Association. There can be no question as to jurisdiction; a Code of Ethics has been laid down; it has been recognized and adopted by subordinate societies, and by them made the rule and guide of conduct of individual members in all their professional relations; in that Code the duty of the individual to the "profession at large" is set forth and his conduct towards it regulated. Now what higher duty does the individual owe to the profession at large than to maintain its character by every means in his power? what more certainly will bring deterioration of character than the introduction of unqualified men? And if it is right and proper for this body to say what shall be dishonorable and what reprehensible in the matter of carrying on the profession, is it not also right and proper for it to lay down regulations in regard to the admission of students to professionally study? We believe this question can only be answered in the affirmative, and are fully convinced that it can be made, and should be made, by the action of this Association, the bounden duty of every practitioner to exert all his influence to prevent students from beginning practice before graduation—to exact from every young man entering his office, a pledge of honor upon this point. We believe, also, that young men who hereafter enter upon practice before graduation, should not have accorded to them that professional recognition and fellowship, which by right belongs only to those who have earned them by a faithful completion of their course.

Finally, *There must be some power to govern and regulate the action of medical schools and colleges.* This we believe to be the most important point of all; without this, reform is impossible. We have already alluded to the fact that in changing the matter and manner of medical education material interests will be affected; now interest warps the judgment, and has always forever prevented or retarded reform of every kind; nothing is ever likely to be done voluntarily for the public good which interferes with private gains. There must be found, therefore, some impelling power to bring about a present loss to individual institutions, trifling though it may be, for the great future benefit, which will accrue to the profession as a whole. Again, a want of "unity of action" is one of the greatest difficulties in the way of educational reform; this want

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can only be supplied by some external influence, such as legislation, or by that power which results from the organization of individuals into societies and associations. In the opinion of your Committee the past history of this subject, in the hands of medical schools and colleges, has demonstrated that they will never voluntarily act together in this matter. Individual professors of every school will freely admit the shortcomings and absurdities of the present system, while the faculties, of which they are members, continue on year after year in the same course; here and there single institutions have made decided improvements in the curriculum or the mode of instruction, but there has been no general and united action, nor is there likely to be until it is brought about by some governing and regulating power. Indeed, truth and our duty compel us to say that confidence has been lost by the profession in any movement of reform originating in the schools alone; so frequently has it been disappointed in realizing any benefit from agitations apparently the most promising, that earnest-thinking men are asking themselves whether anything was really intended to be done, whether these periodical movements have not been designed to cover perverse inactivity with a show of action, and they are now anxiously looking to some other source for the inauguration of reform. To look for legislative aid we have shown to be futile; we believe that the only source from which any movement can originate is to be found in this Association; the only power which can bring about that unity of action, without which success is impossible, results from this organization of the profession into a body politic. The right to legislate upon all subjects affecting the welfare of the profession, and to devise means for carrying such legislation into effect, are clear from a consideration of the aim and structure of this organization. It is composed of delegates from institutions of teaching, hospitals, and medical societies, with individual permanent members, coming direct from the profession; all branches, all interests are duly represented, that none may refuse assent to what shall be ordained by the whole. This view of the legislative power of this Association has not been assented to by some of our predecessors, yet by the majority of preceding committees it has been sustained, and by some has been most ably presented. We quote, for hearty approval, the following extracts:—

"Thus constituted of delegates representing, on a liberal scale, every interest of the profession, our great National Congress exercises an influence and wields a power that has all the force and

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energy of a government. It derives its just powers from the consent of the governed, and rests its claim of authority on the equitable principle that, in representative bodies, the majority must rule. It cannot be considered a merely advisory body, therefore, but must, of necessity, be ranked as a voluntary association of several great interests, reciprocally dependent upon each other, but aiming at the accomplishment of a purpose in which we are alike interested, and thereby exercising, by its moral force, a compulsory power."[1]

"Progress in the right direction can never be attained until the profession represented here shall combine to raise the standard of medical education, by insisting that the reforms which this Association may ultimately decide to be necessary and practicable, shall be carried out in the colleges under no less a penalty than the forfeiture of representation or recognition of the recusant schools in this National Congress, and the withdrawal of the patronage from them of all the State and county medical societies whose delegates constitute the ruling majority of this body. We claim for the physicians of our country, collectively, the right to prescribe who shall become our professional co-equals, and, at the same time, the terms of their admission into the fraternity; although we may yield to the colleges the exclusive right of teaching in conformity with the statutes mutually agreed upon here."[2]

This view, then, that this Association is a congress[3] with ample power to lay down rules for the guidance of the schools, and to demand that they be followed, is not a new one. But your Com-

[1] Report of 1858; by Jas. R. Wood, M. D.

[2] Report of 1860; by D. M. Reese, M. D., LL. D.

[3] Viewing this body as a Congress, which it undoubtedly is, and claiming for it the right to legislate for the profession, and to take measures to make its legislation practical, it is matter for deep regret that the three estates of the realm medical are not more equably represented in it. In many sections of our country, medical societies are rare, distance and consequent expense frequently prevent the attendance of delegates from those of the rural districts, and of the individual permanent members, the consequence is that the representatives of schools and hospitals far outnumber those of the profession at large; when to this is added the fact that the representatives of schools are practised public speakers and well acquainted with parliamentary law, the far greater influence in this body, of the institutions for teaching, is at once seen. The only remedies are a more general organization of medical societies, and a better attendance on the part of permanent members. Attention is called to this fact here, because at the meeting at Baltimore, in 1866, a proposition was introduced to reduce the ratio of delegation of medical Societies from one in ten members to one in twenty. That proposition failed then, but may be revived; should it ever prevail, we believe it would exert an evil influence both upon the Association and the profession at large.

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mittee would not urge it because it is old; but, because it is just; because it is in harmony with our republican institutions; more than all, because its recognition affords the only safe guidance to a better order of things. If this Association has no power to effect needed changes, where are we to look for it? It cannot be found in legislation, nor in public opinion. There is, therefore, no other source from which to expect help if not from this Association; it stands as the legislative body of the profession, the regulator of the action of its component parts, the harmonizer of its conflicting interests, the exponent of its wishes, and it must become the executive of its will. Unless it does so we are convinced there is no hope for the cause of reform in medical education.

The right to control the action of schools and colleges being clear, is its exercise practicable? Your Committee fully believe that it is. Observation and experience of the influence, upon individuals, of general professional opinion, and especially of the publicly expressed opinion of organized bodies, convinces us that equal influence may be thus exerted upon institutions. If just and moderate demands be made by this body they will be complied with; after the action of a majority of the schools in convention assembled, which we have detailed, there cannot be any general opposition by them; indeed, by that action the schools stand pledged to adopt any plan not widely differing from that there laid down. The only difficulty will be with a small minority of the schools, which will believe their selfish interests promoted by refusing to assent to the demands. To meet this difficulty the profession at large must be called on to sustain the Association, and we, therefore, advise that after definite requirements have been adopted, there be published in every annual volume of Transactions a list of the schools that have agreed to follow them, that the profession may distinguish those worthy of confidence and patronage.

No part of the subject of medical education is of greater importance or demands more immediate action than that relating to the preliminary qualifications of the student. It stands, both in natural arrangement and of necessity, at the very beginning, and until some conclusion has been reached, and some plan settled upon in regard to this, it is useless to spend time and attention upon more advanced portions of the cause. That a young man should have had some intellectual training, and possess some classical and scientific attainments before entering upon a study so important

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as that of medicine, would seem to be so apparent as rather to need apology for its statement than argument in its support. That no means have been taken to insure the possession of requisite qualifications by the student, is evidence of great want of regard by the profession for its own interests, and of great neglect on the part of those more immediately concerned in introducing new members into it. But, by no language we could use can the necessity for an examination as to preliminary education be more strongly presented, or action upon the subject more earnestly urged, than has been done already by preceding committees. By one of them it has been forcibly and justly said that "a good general education is the *means* by which the teachings of science are comprehended, and no amount of extension of curriculum, or thoroughness of didactic teaching, will compensate for a neglect, or non-possession of the *avenues* of learning,"[1] and that "there is no defect so glaring, no one which is so irremediable as this." Yet all the representations and appeals made have produced no effect; the matter stands just as it did when the first report was presented in 1847; any young man without mental training, without the slightest classical or scientific acquirements, without even a respectable English education, can enter upon the study of medicine unquestioned, and pass every portal leading to the profession unchallenged.

Among those who have presented their views upon this subject, there has been, as there probably always will be, considerable difference of opinion in regard to how much should be demanded of the student when he enters upon professional study. The same difficulty of harmonizing the desirable and the practicable attends the laying down of a plan for this, as well as for other parts of the course. Were the first proposition of the convention of schools adopted and followed, there would be neither further cause of complaint nor further need of considering this branch of the subject. Since, however, the subject is still unsettled, your Committee will present some comments upon that proposition, which is as follows:—

"That every student applying for matriculation in a medical college shall be required to show, either by satisfactory certificates or by direct examination by a committee of the Faculty, that he possesses a thorough knowledge of the common English branches of education, including the first series of mathematics, the elements of natural science, and so much of the Greek and Latin

[1] Report of 1865; Dr. Thomas Antisell, Chairman.

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languages as will enable him to understand the technical phrases of the profession; and that the certificates presented, or the results of the examination thus required, be regularly filed as a part of the records of each medical college."

The first suggestion we make in regard to this is that the extent of the requirements *should be more definitely stated.* The student should know precisely what will be required of him, that he may prepare himself. Again an examination is far more likely to be enforced, when its extent is accurately laid down, than when the subjects are referred to in a general manner, for indefiniteness of statement and of aim, always leads to inefficient action. We suggest then that the subjects and extent of the examination of the student as to preliminary qualifications, be definitely stated, and as follows: Exercise in English composition which would test the candidate's knowledge of grammar and orthography. That many students are sadly deficient in even such elementary branches as these, is unfortunately well known, and is testified to by several reports of former years. Let the mathematical examination extend to algebra as far as, and including quadratic equations, with plane geometry. In England, for M. R. C. S., the qualification for general practice, it extends through algebra and to the first book of Euclid. In classics we would advise an examination only as far as an exercise in reading, construing, and parsing in the first books of Cæsar. Some knowledge of this language we believe ought to be required, and your Committee cannot consent to drop it entirely from the list of requirements, even after careful consideration of the arguments ably presented in the report of last year.[1] It is not alone on account of its service to the student in understanding the technical terms of science that we would demand it, but as evidence of mental improvement, and especially because of its fundamental relation to our mother tongue; slight as may be the amount we have demanded, "a mere smattering," if you will, we yet believe that its possession will be of very material service to the student in understanding the structure and uses of the English language, and in the acquisition of professional knowledge. We omit Greek altogether, and do so from a conviction that the circumstances and limited time of the vast majority of young men looking forward to our profession, will not permit of this study, and that for all those who cannot take a thorough and complete classical course, the

[1] A. B. Palmer, M. D., Chairman.

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time occupied with it had better be spent in study of the natural sciences. In England, with her maturer age, her stricter professional requirements, and with a very high estimate of classical acquirements in her universities and high schools, Greek has not been made a requisite for entrance upon the study of medicine until the present year, and even then only after notice had been previously given for a considerable time, that such new demand would be made. Upon this subject, we will quote the language of a gentleman of much experience, and high standing in the profession, because we believe his views perfectly correct in reference to the condition of affairs in this country.

"The Medical Council, after a keen debate, and by a narrow majority, have determined to make a knowledge of Greek essential before any student can commence his professional studies. I doubt the wisdom of this. With all my anxiety to see a high standard of general education, I would rather see less demanded and its possession more thoroughly tested. For the higher grades of the profession, for the Doctor of Medicine, who conjoins the testamur of the university to his scholarship as well as his professional skill, a knowledge of Greek is indispensable. Wherever high mental culture is prized, the language and literature of Greece will ever hold a pre-eminent place. But to demand a knowledge of that language from every village surgeon, every "rough and ready practitioner," is a thing which will not be obtained, and will therefore be a mockery and a delusion. If I can read the signs of the times, while the study of Latin will be retained and even extended in our schools, that of Greek will become less general—a prediction which seems borne out by the report of the Schools Inquiry Commission."[1]

But it is especially in regard to the natural sciences that your Committee would urge more explicit demands and wider range.[2] The influence of this class of studies in training the mind of the student, in increasing its powers and expanding its range, and especially in fitting it for the future pursuit of his life, cannot be overstated. Exercising the faculties of observation and comparison,

[1] Preliminary Education, or the General Culture required by the Student of Medicine. A Discourse delivered before the Harveian Society of Edinburgh, April 13, 1868, by Alexander Wood, M. D., F. R. C. P., etc. etc.

[2] "Those who wish to improve medical education must, to my mind, throw all their energies into the attempt to make physical science a very large constituent portion of that education." Prof. Huxley, F. R. S.

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demanding experiment at every step, recognizing nothing as truth until it has been submitted to the severest analysis, the value of the study of natural science as a means of mental discipline is rivalled only by the practical information bearing upon the study of medicine which is derived from it. In trying to define the limits of this study, however, your Committee confess to no little embarrassment, and would be only too glad could a general range be included. Comparative anatomy, for instance, for its value as illustrative of, and complementary to, human anatomy. The necessity for botany, too, seems almost absolute in a country which presents vast regions of which the flora is uninvestigated either for its therapeutic or economic resources. But the demand for these we will forego for the present, sacrificing the desirable to the necessities of the case. A knowledge of physics, however, we believe should be demanded without fail, for its necessity in the study of physiology and especially as preparatory to chemistry. But it is in regard to chemistry itself that we believe such a change should be made as would amount to an entire revolution in the present teaching of medical colleges. We would demand that the student have a thorough knowledge of this subject as far as the chemistry of the inorganic bodies before matriculation at a medical college; he would then be prepared to listen to lectures upon that part of chemistry which is to be of especial service to him in after life. This point was strongly urged by the Committee of 1867.[1] The present mode of teaching chemistry in medical colleges was pointed out to be "far better adapted to an academical than to a medical course of instruction;" indeed the present plan may, without exaggeration, be stated to be an absurdity, and for practical benefit to the work of the practitioner amounting to nothing at all. Much time is occupied even with the subjects of heat, light, and electricity of which the student is generally ignorant when he enters the medical college. The limits of an ordinary lecture session afford but little more than time to get over the elementary parts of this important branch, while that part of it is hardly reached, much less mastered, which relates to the processes and actions of the living body, that part which is most important to the physician, that part which is "the basis of vital dynamics and the sheet anchor of rational therapeutics." The time of the student is taken up with the a, b, c of this elementary subject at a period when

[1] S. D. Gross, M. D., Chairman.

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clinical advantages are, or ought to be, open to him and receiving his utmost attention, and when the dissecting-room offers opportunities which he cannot possibly find elsewhere, and which will never offer again. Were the plan now proposed adopted, were the student acquainted with inorganic chemistry, when he matriculates, how different would be the chemical teaching of our medical colleges! After a brief review of medical physics (a distinct chair in France) and of the elementary part of chemistry, it would consist of practical analysis, and of lectures upon that higher part of the subject, organic and vital, which is so intimately related to the practice of medicine. Then instead of a chemistry adapted to the scholar of an ordinary high school, the student would learn that of the pathologist and the physician—"an altogether special development of chemistry, bearing to the chemistry ordinarily taught much the same relation that the study of human anatomy and physiology has to the study of biology in general, and having a scarcely less distinct bearing upon strictly professional studies."[1]

These are the demands, then, we would make upon the student in regard to preliminary education. Any suggestion that we ask too much would be simply ridiculous, for the standard is far passed in our town high schools. A due regard to the interests of the profession demands considerably more, but, as before said, we have restricted ourselves to the narrowest limits, that no excuse may be offered for not granting what is asked, and thus making a beginning. So meagre is the amount of extra-scientific preliminary education we have required that those unacquainted with the facts might be justified in asking whether we have not presented a plan for lowering rather than elevating the standard of the profession! Our experience, our observation, and the testimony of others, and of committees far more competent of judging, furnish abundant proof, however, that the majority of young men annually seeking to enter the profession are, independent of chemistry, below rather than above the limits we have set, and that the adoption and enforcement of this standard would be a decided improvement upon the present order of things.

Can such a plan be enforced, and in what manner? Your Committee fully believe it can. There are two points in the student's course at which an inquiry into his preliminary acquirements may be especially made; they are, when he commences professional

[1] Dr. Odling: Introductory Lecture at St. Bartholomew's, 1867.

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study, and when he matriculates at a medical college. We recommend that advantage be taken of both these points. Whatever doubt may exist as to the authority of this Association over institutions, there is none whatever as to its power over individuals. As already set forth, the promulgation of the Code of Ethics shows this, and the general adoption of that code by the profession is a recognition of the fact: we here again, then, repeat our argument, that if by the code "duties to the profession at large" may be enforced, no duty transcends that of preserving its character, and we recommend the addition to that code of a section making it incumbent upon every practitioner who receives a student into his office to satisfy himself that he possesses the general qualifications required by this Association, and to see that he acquires the scientific qualifications before he presents himself for attendance at lectures. We heartily indorse the recommendation of your Committee of 1863, that "a failure on the part of any medical practitioner to comply with this reasonable demand should be deemed unprofessional, a violation of the *esprit du corps*, and expose him, if a member of any medical society, State or county, to censure by or expulsion from the same."[1] Your Committee feel that they cannot too strongly urge action upon this point; the jurisdiction is undoubted, the power unquestioned. It affects the very fountain-head of the difficulty; we may debate long and to little purpose as to who is *most* to blame for the introduction of unqualified men into the profession; there is not the slightest doubt that the private practitioner is *first* to blame; and whatever fault may be laid at the doors of the colleges, this much may be said in their excuse, as has been said before, they can act only upon such subjects as come to them from the offices of practitioners; they cannot erect good edifices from poor material.

Passing now to the second and only other point of the student's course at which an inquiry ought to be made as to his preliminary education, your Committee will not cherish the doubt that the schools and colleges will refuse to institute such an examination as that proposed for matriculation. Certainly it would be unjust to think they will refuse to act until a fair trial has been made, and when a majority of the most respectable institutions of our country assemble in convention and adopt a series of propositions

[1] By C. C. Cox, M. D.; in that report recommendation is also made to enforce an examination when the student matriculates.

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which, being acted upon, would be perfectly satisfactory, we are bound to accept that action as in good faith. As such we receive it, and believe, as before said, that the schools and colleges of the country stand already pledged to enforce any plan not widely different from that they then adopted. We ask, then, in regard to this point, the passage of no arbitrary enactments with prescribed penalties, but simply the passage of a resolution setting forth the plan, and urging its practical adoption upon all the medical colleges of the country, with the provision for annual publication in the volume of *Transactions* of a list of the schools which adopt it. Time to act was not fairly afforded them before, until the resolution calling for action was superseded by another; when sufficient time has elapsed without concurrence it will be time enough to consider what farther action shall be taken; but there is a pride of character and a spirit of emulation in institutions as well as in individuals which we believe will render it needless.

Your Committee rest here their recommendations for action, deeming that if such measures be passed as shall for the future discourage and prevent practice without graduation, and which shall insure a certain amount of preliminary education—a very moderate amount it is true—by making it incumbent upon both the practitioner who first receives the student, and upon the college which first matriculates him, to see that he possesses the requisite qualifications, a fair beginning will have been made, beneficial from the moment of its inauguration, and certain to develop into something far better and higher in the not distant future. Will the Association take this action? Will it act *now?* These questions your Committee believe are momentous ones to the interests at stake. The answer to them must be made by you. We would, however, most respectfully but most earnestly represent, that if no action be taken—if nothing at all be done—then that the subject be dropped from consideration for a period of at least five years; that no more reports be called for to which deaf ears are turned; that no more hopes be excited and expectations raised only to end in disappointment, and that the most important subject connected with the elevation of our profession be not allowed to degenerate into a farce.

Having fully considered the points in regard to what action is recommended, your Committee will only touch in the briefest manner upon the others. Of the propositions of the Convention of

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Schools looking to an increase of the term of study from three years to four, and of the courses of lectures to be attended from two to three, we would express a favorable opinion; nevertheless, for reasons already set forth, we do not deem it advisable to recommend such a change at this time, and would call attention to the fact that the adoption and enforcement of a plan for improved preliminary qualifications of the student is a practical lengthening of the term of study, by insuring trained powers and mental discipline, with which more can be gained in a given space of time either by reading, or by attendance upon lectures. In regard to the separation of the licensing and graduating power from the teaching, so often presented to your consideration, we fully concur with the opinions of former committees; the separation is in the highest degree desirable; it would strike at all the roots of evil, whether springing from the office of the private practitioner, or the faculty-room of colleges; it would work an entire reformation in the manner of teaching, and insure faithfulness on the part of teachers, and due qualifications on the part of students. Nevertheless, we are utterly hopeless of seeing this measure carried into practical operation. We are convinced it could only be effected by the strong arm of law, and from the impossibility of legislation being uniform in so many various commonwealths as compose this country, we believe that of all the measures relating to medical education to be carried into effect, this will be the last.

There is one change, however, recommended by the Convention of the Schools, which is believed to be so great an improvement upon the present plan—so beneficial to the cause of medical education, and so advantageous to the student, that your Committee will again call attention to it. We allude to the proposition to divide the term of study into two or more periods, with an examination of the student at the end of each, so as to be satisfied that he is qualified in one grade before passing into the next. The mental confusion which results from pursuing all the different branches of medical study together; the utter impossibility of any person being able to do it effectively, have been too often urged by your Committee to need further argument or illustration. We may add to these the absurdity of expecting a student to possess at one and the same time, when he enters the green-room, a full and complete knowledge of all the subjects making up the science of medicine, from the minutiæ of the most elementary, to the details of the

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most practical; a feat he is never expected to perform afterwards, which is never attempted in practical life. It is unfair to make this demand upon the student, and we believe it has directly caused much of the laxity of the final examination—every examiner feeling that it is unfair—that an impossibility is demanded of the student, and therefore has been lax in his duty, and this laxity has become general and extreme.

We would strongly recommend, then, the establishment of an examination at the end of the first course of lectures, when the student is, or ought to be, about half way through his studies, the subjects of the examination to be physiology, histology, pathology, materia medica and pharmacy, and a portion of anatomy—say osteology, sydesology, and myology. The beneficial effects of such a plan we believe to be obvious; the student would be more certainly and better prepared for the practical branches which follow; his mind would be free to devote to them, unburdened by the attempt to carry on at once so many studies, or to keep himself in so many up to examination point; and, besides, his industry would be powfully stimulated by the examination he is to undergo. French system, the result of long experience, has carried this plan much further than this, and the fourth proposition of the Convention of Schools is substantially the same; in that country the student is examined at the end of the first, second, and third years, and must pass each examination successfully, before passing from the studies of one year into that of the next, the final examination being additional to these. An ardent and able advocate of reform in medical teaching in England urges the adoption of at least one of the pass-examinations of the French system in the following language, which is applicable here, substituting the words "first course" for "first year."

"There is nothing which would improve the condition of our medical schools more than the establishment of a compulsory examination at the end of the first year. The least industrious student will be stimulated to work when he has an examination staring him directly in the face, and that tendency to idleness in the first year which is so constantly complained of by our medical teachers, would be greatly mitigated, if not entirely removed, if first-year's men knew that there was an examination inevitable at the end of that year, and that they would not be permitted to pass on to the studies of the second year till they had satisfied this test.

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The adoption of such a plan would, we are convinced, be productive of incalculable good."[1]

The objections which may be made to this plan cannot, we think, be serious. The colleges certainly ought not to advance as one, the trouble of the additional examination; if they do, we would suggest a division of the sum now charged for graduation, a portion of it going to pay for the certificate of the first examination. If it be urged that young men would go out to practise upon these certificates, perhaps representing them as diplomas, we reply that they had far better thus go out, their proficiency in some subjects being guaranteed, than do as we have shown they now do, go out without qualification in any.

A formal objection to this plan of successive grades in the student's career, was made by your Committee of 1867,[2] which demands brief consideration. It is to the effect that the plan does not provide for a *repetition* of lectures. In the opinion of your present Committee this objection would be valid, were lectures the only mode of obtaining knowledge, or at least they believe that it is incumbent upon the objectors to show that lectures are the *best* mode of instruction. To such a proposition we could by no means assent; while some branches are well taught in this manner, others —which consist mostly of isolated facts—can scarcely be learned at all. General principles may be clearly presented by a lecturer, and by illustration and repetition a knowledge of them and of their relative and absolute value may be impressed upon the student's mind: lectures, too, serve an admirable purpose as a mode of review of subjects which the student has already gone over; but for the acquirement of facts, and for the fixing in the mind as a permanent acquisition, those details of which so many branches in medicine are mostly made up, nothing can compare with close and careful reading, combined with frequent and thorough examinations. Indeed, your Committee cannot avoid expressing their conviction that too much lecturing and too many lectures are great evils in our present system of medical education, and that a nearer approach to the tutorial plan—certainly in a majority of the branches—would be a decided improvement. In this opinion, as to the minor value of lectures as a mode of instruction, we are happy to find ourselves sustained by the testimony of some of the

[1] Notes on Medical Education. Medical Times and Gazette, 1867.

[2] A. B. Palmer, M. D., Chairman.

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most experienced and ablest educators of Great Britain, where this subject has been most earnestly investigated and debated.[1]

We believe the introduction of this plan to be as practicable as it would be beneficial. Let but a dozen of the leading medical colleges of the country adopt it, and agree among themselves to take each other's certificates of first examinations as satisfactory evidence of proficiency in the branches stated, and the thing is done. We believe, too, that this is a change which will be voluntarily made, so soon as the profession generally is informed as to its merits. Already the plan has been adopted by at least two of our medical colleges, and so strongly does it commend itself to the practical common sense of the profession, so substantial are the advantages it presents to the student, that we are convinced other institutions will follow, and that ere long it will be general.

Your Committee will also call the attention of the Association to one other subject having very considerable influence upon the cause of medical education, one which has not been heretofore presented, yet one placed first in the list of those the Convention of Schools was called to consider, but which received no consideration by that Convention, or, at least, no action in regard to it was reported. We allude to "the adoption of a more uniform and just rate of lecture fees by all the colleges in the country." Some action upon this subject is necessary, if only to prevent the lowering of the price of tickets by one school out of competition to another. The "rivalry of the schools," so frequently the subject of animadversion by preceding committees, and to which so many of the evils connected with medical instruction has been attributed, has produced nothing, we believe, so injurious to the character and standing of the profession, nothing so disgraceful as this. It is a spectacle unfortunately very frequently presented within five or six years past, and has in some instances been even carried to the giving away of the lecture tickets! Against a course of proceeding so derogatory to the honor of the profession, so certainly exerting an injurious influence upon the young men who are entering it,

[1] See a series of papers entitled "A Scheme of Medical Tuition," by E. A. Parkes, M. D., F. R. S. London Lancet, vol. i. 1868.

Introductory Lecture at King's College, by Prof. Guy. Med. Times and Gazette, Oct. 3, 1868, and especially

An Address by the Archbishop of York, delivered at the distribution of prizes at St. Mary's Hospital Medical School. Addresses on Medical Education. Hardwicke, London, 1868.

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we feel impelled to protest. The Code of Ethics clearly makes it a point of honor in individuals to conform to the general rate of charges for professional services of the district in which they reside, and although in this country we have entirely abandoned the "honorarium" of mediæval times, it is we believe everywhere deemed ungentlemanly and dishonorable to obtain business by lowering the rate of compensation demanded. This being the rule of ethics for individuals, we can see no reason why it should not be so, but many strong ones why it should rather be more so, for institutions; we know of no code, written or unwritten, by which six or seven men can do with honor what one man can only do with dishonor.

But by some colleges of our country the fees have been placed extremely low, not temporarily, perhaps not from motives of rivalry, but as a permanent rule. We cannot but look upon this as exceedingly unfortunate for the interests of the cause we are advocating. Where an institution pursuing this course is located in the immediate neighborhood of others it gives grounds for suspicion of the dishonorable motives we have just denounced; and in any and every instance it exerts a decidedly injurious influence upon medical education and upon the profession. It is not according to human nature to furnish for almost nothing an article which is really valuable, and which cannot be obtained elsewhere for less than five or six times as much; so palpable is this that it cannot be overlooked, and no amount of special pleading would convince an individual of ordinary intelligence that if the price of an article be placed exceedingly below its known average value, there must be a corresponding deterioration in its quality. Again, extremely low fees for medical instruction act injuriously upon the profession by operating as a bid to men of few attainments and low character to enter it. In proportion as the facilities for entering a profession are increased, those unprepared by education, by culture, by association, or by intellectual pursuits are encouraged to aspire to it; attracted by higher social position or by the hope of leading a more indolent life, young men abandon other callings in life and undertake solemn responsibilities for which they begin too late to properly fit themselves. The effect is obvious, and has been well stated by one of the most eminent of our brethren.

"Every ignorant man admitted into our profession has an injurious influence on the estimation in which the entire body is held. His demerits have a tendency to lower us throughout the circle in which he is known. The want of confidence in him—the want of

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respect for him—beget distrust and disrespect for the profession in general."[1]

The only arguments we have seen advanced in favor of placing the fees for lectures at the very lowest figures, are that, thereby, poor and worthy men are induced to enter the profession, and that some of the brightest ornaments of our profession come from the lowest ranks of life. Both are specious; to make the first good it should be shown that the graduates of such schools are more worthy than those of others, or that a greater proportion of them achieve distinction in after life. As to the second, we believe if the testimony of the self-made men of our own or any other profession were taken, no one would scout more heartily than they the suggestion, that if the difficulties of their course had been thus, and to this extent increased, their progress would have been thereby stopped.

But it must in justice be admitted that there is an excuse for the general lowness of fees throughout the northwestern section of our country; it is frequently pleaded, and we cannot but admit its force. We allude, of course, to the existence of a well-known State institution, which, deriving its revenues from the commonwealth, furnishes medical lectures at a much lower rate than any other respectable institution. Although it is only in connection with abundant endowment that low fees for medical instruction ought to be tolerated, and only when the examinations are of the strictest character, and the standard high, that they should be looked upon with favor, yet even under these circumstances, we are convinced that they exert an unfavorable influence by keeping down the rates in neighboring institutions, and thereby favoring the influx, through other channels, of unworthy and unprepared men. The case in point is no exception to the general rule, and with these views we cannot but regret the existence of this institution. We have no aspersions to cast upon the character of the gentlemen connected with it; no charges to make of neglect of duty; but, with full recognition of the honorable position the institution has won for itself, we are compelled to believe that its influence in keeping down the fees of other institutions is great, and for the reasons we have set forth, believe it to be in this manner injurious upon the cause of medical education. We regret to say that we can suggest no remedy for this evil. Until the citizens of the State shall see how unfair is the competition of the common-

[1] Dr. Geo. E. Paget, Address before the British Medical Association, 1864.

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wealth with the individuals of other States, until they see how faulty is that political economy which expends the public revenues in fitting for the active duties of life, a class only indirectly productive, or until they recognize the palpable injustice of crowding from the benches of their university the sons of their own citizens by students from other States, there will be no relief.[1] But in regard to the matter of fees for lectures by medical colleges generally, your Committee would recommended immediate action. Let a minimum price be fixed, to descend below which by any school or college shall be to forfeit recognition by this Association. Such action we believe to be just, demanded by the interests of the profession, and in accordance with the powers and intents of this organization.

Your Committee will call your favorable attention to a suggestion of the Committee of 1867,[2] that there be another degree in medicine established and recognized, so that hereafter there may, as there certainly ought to be, a distinction "between a student who is eminently qualified for the practice of medicine and surgery, and one whose attainments are of an inferior character." Such a distinction exists in every other country, and ought to exist here. We greatly stand in need of something to call forth the spirit of emulation, and stimulate the energies of our young men, in acquiring scientific distinction, and the want will be felt more year by year as our country grows in wealth and in culture, and improves in educational advantages. High degrees may seem to some but trifles, and may perhaps be sneered at as not in accordance with the utilitarian spirit of the times; nevertheless, in all ages of the world, men have striven for such marks of distinction over their fellows, and valued them in proportion to the difficulty of winning them. Whether the prize has been a ribbon to be won in the deadly breach, or at the cannon's mouth, or a title to be gained only by long and severe study, there has never been lack of competitors, and there is no reason for believing that human nature is now essentially different from what it has always been. We would,

[1] It is not supposed that the gentlemen comprising the Medical Faculty of this Institution control the fees. The Committee are happy to be able to say that they have direct assurance from them that "they earnestly desire to see the views of the Association fully carried out, and will promptly and cheerfully, and in good faith, unite with the principal medical schools of the country to accomplish the object sought."

[2] S. D. Gross, M. D., Chairman.

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therefore suggest the degree of Bachelor of Medicine; the candidates not to be eligible within three years of graduation; the classical examination to be thorough, including both Latin and Greek, or this to be dispensed with, if the degree of A. B. of a respectable college be held; at least one modern language to be required; the scientific examination to be general and strict upon those branches closely allied to medicine, as comparative anatomy, botany, and chemistry, with a more thorough and wider examination upon medical subjects, especially upon clinical medicine, surgery, and obstetrics.

We believe that no great difficulties stand in the way of the establishment of such a degree, certainly none which should prevent the experiment being tried. It requires but the concurrent action of three or four of the oldest and most respectable of our institutions to agree upon the requirements and mode and times of examination. No addition to, or change in, teaching arrangements is demanded—the degree would, we believe, be more valuable if the institutions conferring it did not require that the knowledge should be gained within their limits, but asked the candidate only for proof that he had it, not as to where he got it. We cannot escape the conviction that great and substantial benefits would accrue to the profession from the adoption of such a degree while no interests are disturbed or injured, no present plans interfered with. Possibly the benefits may not be realized immediately; yet every generation must plant trees the fruit and shade of which are not for itself but for its successors.

In bringing the task committed to our hands to a close we would take a critical survey of the subject of medical education during the last twenty years in reference to the questions whether during that time any progress has been made, and if so, whether sufficient to give encouragement for the future. We answer both queries in the affirmative. Although the preliminary qualifications of the student are still left entirely to the discretion of the private practitioner, although "the curriculum of study is essentially the same now as in 1813," although grossly incompetent men are still sent forth with the diploma of colleges, we still find cause for encouragement. We find it even in the fact that the subject is kept in constant agitation. By continual recurrence to it, restatement of its claims, re-examination of the reforms to be made, information is diffused, views enlarged, the spirit of the profession awakened, and the approaches to united and harmonized action gradually made

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easier. But we think we can point to more substantial evidence of improvement; some colleges have lengthened the lecture term, some have increased the number of subjects taught, and there has been within that time a more general recognition of the fact that clinical instruction is an indispensable part of medical teaching and an increase of clinical advantages has followed, while two colleges have adopted the admirable plan of dividing the course of study into an elementary and a more advanced and practical part. The result of the examinations for the army show, too, a slight improvement, which we are happy to chronicle; although it must be considered disgraceful when as high a proportion as fifty per cent. of the graduates of our schools is rejected by that tribunal—the proportion is less now than in 1846. A communication made by the Surgeon-General to this Association at that time, showed that only one quarter of those presenting themselves succeeded in passing, while by the following table it will be seen that nearly forty per cent. are successful:—

Table[1] showing the number of applicants for admission into the Medical Staff U. S. Army examined, found qualified, rejected, etc., from 1848 *to* 1868 *(twenty years).*

No. of applicants examined				651
No. found qualified	256		Per cent. 39.32	
No. permitted to withdraw after partial examination	174	Per cent. 26.73		
No. rejected	221	33.95		
			60.68	
	651			651

[Official.] C. H. CRANE,
Asst. Surgeon General U. S. Army.

Surgeon-General's Office, July 16, 1868.

Taking courage then from the progress of the past, however far it may be from what may have been desired, we would encourage hope for the future. To rest satisfied with the present state of affairs is impossible; to stand still is not characteristic of the race from which we have sprung; it is not characteristic of our noble profession; it has never ceased to advance, and never will; "eternal progress" is its motto, applicable as well to its internal composition as to its conquests over disease.

The agencies by which reforms will be effected and advances made, we believe, will be chiefly these:—

An improved tone of professional opinion to be especially

[1] For the courtesy of the Surgeon-General in furnishing this table the Committee here makes grateful acknowledgment.

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brought about by a more general formation of active medical societies bringing the individuals of the profession into organizations acting harmoniously with this body.

The influence of high-toned and independent medical journals. In this country we have no central medical press, no single organ to reach the profession generally, and in too many instances our medical journals are controlled by gentlemen connected with medical schools, and, of course, liable to be influenced by the interests of the institutions with which they are connected. Nevertheless journals are springing up untrammelled by any interests of this kind, and some few have spoken upon this subject without fear or favor. To such, we think, especial thanks are due, and we look to an independent medical press as among the most important agencies of reform.

But above and beyond all other influences we would place the action of this Association. The organized embodiment of the profession, the authorized and accepted exponent of its wishes, it ought to be executive of its will. If it will become so—if it will act in this matter firmly, consistently, steadily progressive, it will in due time effect every desirable change, and the profession will rapidly rise in the respect and confidence of the public. If it will not, if it continue to pay no regard to the earnest representations made to it, to listen to reports only to consign them to oblivion, there is little hope for the cause of medical education, or for the character and honor of the profession. Some few improvements may struggle into existence in the future as they have done in the past, but that steady, united, and decided advance which is so much needed will not be made, but the deplorable condition of the present remain an indefinite length of time in existence.

J. C. REEVE.
GEO. McCOOK.

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REPORT OF THE SECTION

ON THE

Practice of Medicine and Obstetrics.

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REPORT OF THE SECTION

ON THE

PRACTICE OF MEDICINE AND OBSTETRICS.

TUESDAY, May 4, 1869.

SECTION met on the second floor in Mechanics' Institute Building, at 3 o'clock P.M., and was called to order by Dr. H. VAN DUSEN, of Wisconsin.

Dr. H. F. ASKEW, of Delaware, was elected Chairman, and Dr. JOHN C. HUPP, of West Virginia, Secretary of the Section.

The report of the Committee on the *Training of Nurses* was read, and, on motion of Dr. T. PARVIN, of Indiana, it was

Resolved, That the report on the *Training of Nurses* be referred to the Committee of Publication, and that the resolution accompanying the report be presented to the Association, and its passage recommended.

Dr. T. C. OSBORN, of Alabama, read a paper on the *Peculiar Appearance of the Tongue in Malarious Diseases*, accompanied with a plate, which was, on motion, referred to the Committee of Publication.

A paper on *Quinia, its Prophylactic and Therapeutic Uses and Abuses*, by Dr. STEPHEN ROGERS, of New York City, was presented, and a synopsis of it read by Dr. E. LEE JONES, of New York, which, on motion, was referred to the Committee of Publication.

A lengthy paper on *Alcohol and its Relations to Medicine*, by Dr. BELL, of Pennsylvania, was presented, and, on motion of Dr. MILLER, of Alabama, it was referred to a committee of the Section consisting of Drs. MILLER, of Alabama, MENDENHALL, of Ohio, and VAN DUSEN, of Wisconsin, to report at the meeting of the Section to be held to-morrow.

On motion the Section adjourned till 3 o'clock P.M., the 5th May.

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WEDNESDAY, May 5, 1869.

Section met at 3½ o'clock P. M. as per resolution of the Association, Dr. ASKEW in the chair.

The sub-committee of the Section, to whom had been referred Dr. BELL'S paper on *Alcohol and its Relations to Medicine*, reported that they had carefully examined the essay, and recommended that it be referred to the Committee of Publication, which was adopted.

Dr. E. D. MCDANIEL, of Alabama, read a paper on *Warm Cerebro-Spinal Bath in Congenital Apnœa* and on a *New Method of Artificial Respiration*, which, on motion, was referred to the author for a more full report.

On motion the Section adjourned till 9 A. M. on Thursday.

There was no meeting of the Section on Thursday.

Subsequently, on Friday, Dr. MCDANIEL'S paper was handed to the Chairman of the Section, who ordered that it be noted by the Secretary that the paper will be handed to the Committee of Publication.

JOHN C. HUPP,
Secretary of the Section.

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REPORT

OF THE

COMMITTEE ON THE TRAINING OF NURSES.

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REPORT OF THE COMMITTEE ON THE TRAINING OF NURSES.

THE undersigned, acting as a special committee under an appointment of this Association to report on the best method of organizing and conducting institutions for the training of nurses, beg leave to state that they have had the subject under consideration, and now offer the following suggestions for its practical and efficient execution.

The establishment of schools for the education of nurses, for private and public purposes, is a desideratum which has long been keenly felt in this country, both by the medical profession and by the people at large. That this want should not have long ago been supplied is a curious anomaly in the history of human enterprise and of Christian charity, well calculated to cause surprise, if not positive astonishment. Considering the wonderful mental and physical activity of the age in which we live, and the numerous expedients that have been devised for the improvement of the comfort and happiness of our fellow-beings, it is remarkable that the subject in question should have hitherto been so singularly neglected by all denominations of Christians, except the Catholic, whose noble deeds in preparing nurses for the sick and infirm of their own church reflect so much credit upon their charity and philanthropy.

Good nursing, as has very justly been observed by an intelligent writer, is half the battle in disease; if the other half be as well managed, the result can hardly fail to be all that the nature of the case demands. It is often incomparably more valuable to a sick man than the most skilful medication. It is the right hand of the medical practitioner. Thousands of human beings are daily lost by bad nursing. However thoroughly a case may be understood, or however judiciously it may be prescribed for, it is evident that, if the injunctions of the medical attendant are not faithfully, hon-

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estly, and intelligently carried out, the treatment must fail of the end intended, or, what is worse, produce results the very reverse, perhaps, of those desired. There should, in every instance, be the best possible understanding between the physician and the nurse, inasmuch as it is their sacred duty to co-operate with each other, to the best of their ability, in their efforts to arrest disease and stay the hand of death. Harmony and honesty of purpose should mark every step of their progress. An educated, intelligent, conscientious nurse is a great blessing, and an invaluable member of the community, as one of an opposite character is a great evil, if not a positive disgrace. In either event, she may, by the exercise of her power, hold in her hands the key of life and death. In the former case, she may do much to correct the errors of an ignorant, careless, or unscrupulous physician; in the latter, the best directed efforts of the most enlightened practitioner may be effectually thwarted, and a disease or injury, originally insignificant in itself, be hurried on to a fatal crisis.

The subject of nursing possesses a deep national interest. It personally concerns every human being, of whatever age, rank, or condition in life—alike the rich man in his palatial residence, the mechanic in his cottage, and the peasant in his humble hovel. All are alike intimately interested in its faithful administration and in its final issue. It is perhaps fortunate that the mortality occasioned by bad nursing cannot be properly estimated by those more immediately affected by it, as a knowledge of it would entail upon them an immeasurable amount of misery and mental anguish. Mankind look with horror upon the destruction of human life upon the battle-field and during the prevalence of epidemics, as cholera, scarlet fever, and smallpox, because its appalling character is everywhere patent to the public eye; every one sees and hears and talks about it; but few persons can form any adequate conception of the vast number of human beings who are daily, nay, hourly, sacrificed upon the unhallowed altar under consideration.

Nursing, in its more exalted sense, is as much of an art and a science as medicine. The educated physician is sought for far and wide; his skill is in constant requisition; day and night he is at the bedside of the sick and the dying; at every visit he makes his prescription and leaves his instructions; he literally wars with disease and death; he necessarily, from causes which no human agency can control, loses many patients, and many also who could be saved if his efforts were properly seconded by efficient nursing. The

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commander of an army cannot be victorious if he is not properly aided by his subordinates, the lieutenants, whose duty it is to carry out his orders and the minor details of the campaign. In private life there is hardly one really good, intelligent, or accomplished nurse in a hundred who exercise the functions of that office, one who is perfectly familiar with all the duties and requirements of the sick-room; and what is true of private society is still more true of the hospitals, almshouses, infirmaries, asylums, jails, workhouses, and similar institutions, in the United States. It is a mistake to suppose, as is so often done, that any and every individual, whether male or female, is fitted for such an occupation, as if nursing, like poetry, were a gift of nature. Many persons are utterly incapacitated by their constitution and habits for such a task, and yet, as society is now constituted, there is hardly one who may not, sooner or later, be compelled to exercise it. In private families, this duty usually devolves upon the mother or daughter, who, in ninety-nine cases out of a hundred, are totally ignorant of the first principles of nursing, and therefore wholly unfit for the discharge of so sacred a duty as that involving the health and life of a human being affected by disease or injury. In public institutions the same ignorance prevails, superadded, not unfrequently, to the basest moral delinquencies, as intemperance, indifference to duty, and positive disregard of the orders of the medical attendant. Male nurses are everywhere notoriously bad and incompetent. Few, even in our large towns and cities, are qualified for their business. Drunkenness and male nursing are almost synonymous terms in the experience of the American physician.

How are these defects, so glaring in their character, and, in their results, so fraught with danger to health and life, to be remedied? By the organization of institutions for the training of nurses? Such institutions are undoubtedly much needed, and they should be established in every town and city in the United States. That they would or could, however, fully, or even in a considerable degree, accomplish the object, no one acquainted with the subject would for one moment assert. They would, compared with our great wants, be as a drop in the bucket, or, to employ a still more forcible expression, like the attempt of a husbandman to fertilize a vast field with a handful of lime. We need good, well-trained nurses by the thousand. Every community, throughout the length and breadth of the land, should be supplied with them, in order to do full justice to the subject.

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On the continent of Europe, institutions for the training of nurses have existed, either independently of or in connection with certain hospitals, for centuries; and, while no one can deny that they have been productive of incalculable benefit, it must be obvious to every reflecting mind that their influence has been exceedingly circumscribed. The Sisters of Charity, as they are denominated, those angels of mercy who shrink from no duty enjoined by suffering humanity or the requirements of a holy religion, have for ages been the ready servants of the medical staffs of these institutions in carrying out their behests, and in smoothing the pillow of the sick and the dying wherever their presence is needed.

It is not accurately known when or by whom Sisterhoods, which have done so much to advance the interests of nursing, were originally founded. The honor, however, is generally ascribed to Paula, a Roman lady of noble birth, and a lineal descendant of the Scipios and the Gracchi, who, disgusted with the demoralization of her native city, gathered up her broken fortune, and, with her daughter, settled at Jerusalem, near the close of the fourth century. Here, as the story goes, she assembled around her a number of her sex, in various stations of life, some rich and others poor, and devoted herself and her order, without taking or exacting any vows, to works of charity and the nursing of the sick; in a word, to what is now called parish visiting. When Landi, Bishop of Paris, in 650, founded the Hôtel Dieu, he placed it under the direction of the hospitaliers, or nursing-sisters, who have retained their position and influence in this old receptacle for the sick down to the present moment, through all the changes and vicissitudes of the French government.

At the commencement of the French Revolution, that revolting and sickening period of human crime and human history, the Sisterhood of Charity had four hundred and twenty-six houses in France, as well as many in other countries, with six thousand members actively engaged in the exercise of their peculiar vocation. Prior to that time, the chief military hospitals and the naval hospitals at Brest, Saint-Malo, and Cherbourg had been under the charge of these noble women. At present, and, indeed, for many years past, the naval hospitals at Toulon and Marseilles, in addition to those just mentioned, have been attended by members of the Sisterhood. The whole number of females embraced in these charitable orders was in 1848, according to Mrs. Jameson,[1] to whom we are indebted

[1] Sisters of Charity, p. 69; Boston, 1857.

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for these facts, at least twelve thousand. The nursing in all the civil hospitals of France is performed by these Sisters; and similar regulations exist in most, if, indeed, not all, the Catholic hospitals in other parts of the world, both Old and New. In the United States and Canada the presence of these noble, self-sacrificing women forms a striking feature in every institution of the kind. Many of them, as we know from personal experience, are highly educated and refined ladies, whose whole existence is devoted to the care and nursing of the sick.

The Committee cannot permit this opportunity to pass without paying a feeble tribute of respect and admiration to the Sisters of Charity, on account of the noble work in which, for upwards of twelve centuries, they have been steadily engaged, in carrying out the objects for which their order and the various branches growing out of it were originally instituted. A more honest, upright, devoted, self-sacrificing body of women never existed. The Catholic church, under whose direction and auspices they have so long and so faithfully labored, has set an example worthy of the imitation of all denominations of Protestants, who, it cannot be denied, have too long stood aloof from this great work which reflects so much credit upon their Catholic brethren. No one can witness the disinterested sacrifices of the Sisters of Charity—their unceasing devotion to the sick and the dying, their unflinching courage in times of epidemics, their daily toils, and their midnight vigils for the benefit of suffering human beings—without the most profound admiration for their character, and a deep sense of gratitude to Almighty God for permitting such beings to dwell among men.

The Protestant church, so long idle in this great work, is beginning to perceive its importance, both as a matter of duty and of self-interest in sustaining her religious and charitable character, and is, apparently, girding her loins for active exertion. Numerous women, many of them of high birth, excellent education, and great refinement, are ready to enter the field, and are willing to spend their time and talents, nay, if need be, even their very lives, in the furtherance of its great objects. Much good has already been effected; and the Committee are sanguine that a work so auspiciously commenced will be steadily carried forward until the number of women engaged in it shall rival that noble band known by the expressive name of "Sisters of Charity."

The establishment of the Protestant Sisterhood is of recent origin. In 1836, an obscure but most worthy clergyman, Mr.

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Fliedner, opened at Kaiserwerth, a small town near Dusseldorf on the Rhine, a training school for female nurses. Every one who offers herself is admitted on trial for six months, during which she is obliged to pay for her board, and wear her accustomed garments. If, at the end of this time, she is satisfied with her vocation, she undergoes a further probation of from one to three years, puts on a distinctive dress, and lives at the expense of the institution. After her education is completed, she receives annually a small sum for clothing, but nothing more, as the sole object is to work for the sake of God and humanity. If, however, she should become disabled by age or disease, the parent institution obligates itself to receive and protect her. A certain number of sisters are educated for the office of parish visitors. The establishment, in 1855, had one hundred and ninety members, of whom sixty-two were still probationers. Of the hospital sisters, eighty were stationed at different hospitals in Germany, five in London, three at Constantinople, five at Jerusalem, two at Smyrna, and two at Pittsburg, Pennsylvania.

As outgrowths of Mr. Fliedner's establishment are the sisterhoods and schools for the training of nurses at Berlin, Dresden, London, Paris, Strasbourg, and other cities in Europe. It is not without interest to state that Miss Florence Nightingale, who had charge for some time of the Female Sanitarium in London, and who earned such a world-wide reputation by her philanthropic labors during the war in the Crimea, had been a regular pupil for several years at Kaiserwerth. The institution at Berlin is under the special care of the Queen of Prussia; and the one at Dresden was founded by the Countess Hohenthal, a lady celebrated throughout Germany for her charitable acts and amiable qualities.

In Great Britain, the parent institution for the training of nurses is St. John's House and Sisterhood, founded at London, in 1848, the first meeting for the purpose having been held under the auspices of the Duke of Cambridge, assisted by a large number of prelates, noblemen, and other eminent persons. It is an establishment of the Reformed Church of England, in which Christian women, members of that Church, are associated in a community under the presidency and visitatorial sanction of the Bishop of London. The chief function of the inmates is to elevate the profession of English nurses by giving them the best possible training in the hospital ward, and uniting them, under a sense of religious responsibility, into a sisterhood as members of a Christian family and home.

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Everything has, from the beginning, been conducted on the volunteer system, both on the part of the sisters and nurses, without the exaction of vows, monastic obedience, celibacy, cloistered seclusion, or other restraint whatever. In a word, they are all, both in wishes and inclinations, free agents, wholly devoted to the cause of Christian charity. It is worthy of remark that all the sisters at St. John's House are ladies.

The members of this establishment are divided into three classes, sisters properly so called, associates, and probationers, who all wear a cross with a badge of the institution upon it. The nurses are provided with a medal bearing a similar device, which they wear so long as they remain in service. The dress is simple, cheerful in appearance, and, in every respect, well adapted to the nature of the work to be performed. The sisters, who are also called deaconesses, rise early, attend prayers four times a day at the chapel, visit the sick in their particular districts, and spend several hours each day in the wards of some hospital, in the general supervision of the nurses. In addition to these duties they devote themselves to the training of nurses for public institutions, the poor, and private families.

St. John's House and Sisterhood furnished some of the first women who accompanied Miss Nightingale to the East in 1854; and in the following year it prepared and sent upwards of twenty lady nurses to the seat of war. It established training schools in 1856 at King's College Hospital, at the English Galignani Hospital in Paris in 1865, and at the Charing Cross Hospital, London, in 1866. The board of managers of the first-named institution, in January, 1862, set apart a ward of ten beds, on an upper floor in that building, as a midwifery ward, for the reception and treatment of poor married women, and for the training of midwifery nurses for country districts, under the supervision of the sisterhood of St. John's House; an arrangement productive of great good and highly satisfactory to all concerned.

It is quite impossible, with the slender data before the Committee, to determine, with any degree of accuracy, the present number of these institutions in Europe: the probability is that it is not far short of one hundred. In London, besides St. John's House and its appendages, already referred to, there are the training schools for nurses at St. Thomas', the Middlesex, and University College Hospitals, all in a highly flourishing condition. The first named of these establishments is supported by the "Nightingale Fund,"

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under the immediate superintendence of Miss Wardroper, a most estimable and efficient lady, aided by a council of eminent and influential men, among whom are Lord Houghton, Sir James Clark, Mr. Bence Jones, and Mr. William Bowman, the distinguished anatomist, surgeon, oculist, and author. The school for midwifery nurses in this institution was recently closed for the want of suitable accommodations; but there is reason to believe that it will be reopened upon the completion of the new hospital edifice. The Middlesex Hospital designs to erect, at an early day, and at a great cost, a building capable of lodging sixty-six inmates. The school, under the admirable supervision of Miss Martyr, is in excellent working order.

The Liverpool Training School and Home for Nurses, established under the auspices of the Royal Infirmary of that city, has been in successful operation for several years; and, under the wise and efficient management of Miss Merryweather, the lady superintendent, has been productive of an amount of benefit which it would be difficult to overestimate. The object of the institution is to prepare women desirous of working as hospital, district, and private nurses, and to afford them every facility for future usefulness by the most thorough system of training in the wards of the Royal Infirmary. From the Report for 1867, now before us, it appears that seventy-seven women were on the staff at the end of the year, of whom twenty served as nurses and twenty-seven as probationers in the hospital. About one hundred cases of sickness in private families were attended by the nurses, and upwards of four thousand sick poor were visited and relieved in the districts under the charge of this noble establishment.

At least two training schools for nurses, both founded in 1866, are in successful operation in Dublin. One of these is under the charge of Stephens' Hospital, and the other under that of Sir Patrick Dun's Hospital, the latter being under the direct management of Miss Probyn, a lady preëminently qualified, by education and habit, for so important a position. The principles on which these institutions are conducted are essentially the same as in the sister establishments in London, Liverpool, and other cities in England.

So far as the information of the Committee goes, little has been done in the United States in regard to the training of nurses outside the Catholic Church. It is believed that the oldest institution of the kind in the country is the Nurse Society of Philadelphia, established upwards of a third of a century ago, by an association

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of Friends, and amalgamated with the Lying-in Charity in 1844 under the name of the "Philadelphia Lying-in Charity and Nurse Society." From the Annual Report of the Board of Managers of this excellent Institution for 1867, it appears that there were then twenty-two resident and eleven registering nurses at the Home. Of the 361 applications for nurses received from citizens during the year, only 205 had been answered, thus showing how entirely inadequate the demand was to the supply.

The Bishop Potter Memorial House, opened in 1867 in connection with the Episcopal Hospital of Philadelphia, is conducted upon the same principles as the Protestant training houses and sisterhoods in Germany, England, France, and other countries; and, under the discreet and admirable management of Mrs. Jackson, a lady of high mental culture and social position, holds out great promise of future usefulness. The institution has three departments—nursing, mission work, and parish schools—the primary object of each of which is religious visitation and instruction. The nursing branch does not embrace any menial service, and has hitherto been confined almost exclusively to the wards of the hospital. The number of inmates at present is very limited, but it is intended, as it increases, to extend the sphere of their operations into the surrounding districts.

In Boston, at the New England Hospital for Women and Children, attempts have been made, but thus far with little success, to educate nurses for public and other purposes. The inducements held out are the advantages of the practice of the hospital with boarding and washing, and also a small sum after the first month of probation; but, notwithstanding this, there have, it seems, been few applicants who are willing to dedicate themselves to the work.

The Committee have entered into these historical details with a view of showing how little the Protestant church has as yet accomplished in this important field of human enterprise and Christian benevolence. In this country, so replete in energy and progress, and so thoroughly alive to all the wants of a great people, the ground lies literally fallow, hardly a furrow having been drawn to serve as a landmark to arrest public attention. It will be difficult, half a century hence, to account for the utter apathy that has hitherto existed upon this subject; to find a reason why, in a country and in an age which have provided a remedy for almost

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every other necessity, this alone should have been so sadly overlooked and neglected.

This want of enterprise has not been due to any want of material. Thousands of good and noble women are ready to enter upon the good work. All that they need is proper encouragement and a little aid at the outset, until, by a course of practical training, they are fitted for the discharge of their onerous and responsible duties. The late war afforded a striking illustration of what woman, roused by a sense of patriotism and humanity, is capable of accomplishing when her services are required by her bleeding countrymen. Everywhere, by day and by night, in season and out of season, she was seen amidst the sick, the maimed, and the dying, alleviating suffering, smoothing the wrinkled brow, inspiring hope and confidence in the desponding, and performing the most trying, menial, and revolting offices, without the hope or expectation of pecuniary reward. The mortality, great as it was, would have been vastly increased if the efforts of the surgeons had not been faithfully seconded by these warm-hearted and generous women, so utterly forgetful of self, and so full of sympathy and tenderness for others. The good effected by Florence Nightingale and her brave and devoted band in the Crimean war called forth the strongest acknowledgment of the British government, and elicited the admiration of the civilized world. "Henceforth," says a distinguished female writer, "the name of Florence Nightingale is dear and familiar in our households; women glory in her, men rise and call her blessed." What this good and noble woman accomplished on the other side of the water our women accomplished on this. Their angelic deeds constitute one of the brightest and most enduring pages in the history of the late war, so distinguished for the Christian exploits and heroic devotion of American ladies.

It will be perceived from the above account of these institutions that the number of nurses educated under their patronage and direction is exceedingly limited, and therefore entirely inadequate for the public demand; that the nurses themselves, in a majority of them, consist of two distinct classes, the ladies, or deaconesses, whose labors are mainly of a parochial character, and the nurses, properly so called, the latter of whom, of course, occupy a subordinate rank; that the training is conducted in a desultory and irregular manner, without any definite system or order; and, lastly, that they embrace no provision whatever for the education of male

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nurses. The latter are, it is true, not as necessary, either in public or private practice, as the former; still, there are cases in which the female nurse is comparatively powerless, and where, consequently, the aid of the other sex is indispensable. This is particularly true of all cases of severe injuries, as wounds, compound fractures and dislocations, and the capital operations, where much lifting or frequent change of posture is required for the comfort and welfare of the patient. These, however, are exceptional cases, and the fact has long been established that, as a rule, female nurses are incomparably better adapted to the work than male, who are, as already remarked, too often coarse in their language, unfeeling in their manners, impatient, intemperate, and devoid of that tenderness and sympathy so characteristic of the other sex, and so necessary in the sick-chamber. Even in lunatic asylums, where one might, *à priori*, suppose that male nurses were, from the boisterous and unmanageable nature of many of the inmates, perfectly indispensable, women are, it would seem, better fitted to calm and soothe the irritated mind and to maintain discipline than men. In England, through the exertions of Dr. Maudsley and Dr. Chrichton Browne, an effort is now on foot to substitute female for male nurses in many of the lunatic wards throughout the country. It has been ascertained that the mortality of male lunatics in asylums is nearly one-third greater than that of female lunatics; that the deaths are most numerous when nursing is at its point of greatest relaxation; and that the presence of female nurses in male wards is much more effective in restraining the outbursts of violence, abusive language, and offensive habits than of male nurses. "In a word," says Mr. Browne, "their whole conduct seems to be softened, and their tone of feeling ameliorated, by the simple expedient of introducing kind hearted female nurses among them."

Another fact determined by the experience of the last ten years is that there is not only a marked diminution of mortality in those hospitals in which the nursing is performed by trained women, but a decided diminution in their expenditure, and a great improvement in the moral condition of the inmates. The wards are kept in a more cleanly and orderly manner, the ventilation is much more carefully attended to, the medicines, food, and drink are administered with greater regularity, and a moral atmosphere prevails, the sanative and purifying influence of which it would be difficult fully to estimate.

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Taking, then, all these circumstances into consideration—the promotion of health and comfort, the saving of life and money, and the improvement of the moral and religious condition of the sick—the Committee would respectfully urge upon the medical profession and the country at large the absolute necessity of employing none but well-trained nurses both in public institutions and private families. It is believed that such an arrangement is demanded by the interests alike of society and of individuals, and it may be boldly asserted that the time for its accomplishment is at hand. The late war made many thousands of widows, and doomed many thousands of young women to perpetual celibacy, who, in consequence of their straitened circumstances, are ready to enter upon this good work, and devote themselves, heart and soul, to its behests.

To afford the proper facilities for carrying out this grand design, the Committee are of opinion: 1st. That every large and well-organized hospital should have a school for the training of nurses, not only for the supply of its own necessities, but for private families, the teaching to be furnished by its own medical staff, assisted by the resident physicians.

2dly. That, while it is not at all essential to combine religious exercises with nursing, it is believed that such a union would be eminently conducive to the welfare of the sick in all public institutions; and the Committee therefore earnestly recommend the establishment of nurses' homes, to be placed under the immediate supervision and direction of deaconesses, or lady superintendents, an arrangement which works so well in the nurses' homes at London, Liverpool, Dublin, and other cities in Europe, and at the Bishop Potter Memorial House in Philadelphia.

3dly. That, in order to give thorough scope and efficiency to this scheme, district schools should be formed, and placed under the guardianship of the county medical societies in every State and Territory in the Union, the members of which should make it their business to impart, at such time and place as may be most convenient, instruction in the art and science of nursing, including the elements of hygiene, and every other species of information necessary to qualify the student for the important, onerous, and responsible duties of the sick-room.

The Committee would further suggest the importance of forming in every convenient place nurses' societies, the regular members of which should, in all cases, other things being equal, have the pre-

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ference, as it respects the recommendation of the practitioner over the ordinary ignorant or uneducated nurse. In this manner an *esprit de corps* could be established which could not fail to be highly advantageous to the public as well as to the medical profession.

In conclusion, it may not be amiss to offer a few remarks upon the qualifications of a nurse; or, in other words, the duties which she may be required to perform in the wards of a hospital, and in the private sick chamber.

1st. To do justice to her vocation, or to perform her labor with alacrity and efficiency, a nurse must be of sound constitution, of good muscular strength, and of great powers of endurance, capable of bearing up manfully under fatigue and loss of sleep.

2dly. Her age, at the commencement of her career, should not be under twenty-two or over thirty-five.

3dly. She should possess a certain amount of common education; at all events, she should be able to read and write; be of a gentle and refined disposition, courageous, patient, temperate, punctual, cheerful, discreet, honest, sympathizing, and ever ready and willing to perform every service, however menial or disagreeable. Her moral character should be of the purest kind, and she should be willing to devote herself unreservedly to the duties of her vocation.

4thly. She should possess the faculty of observation in order that she may be able to notice with advantage the character of the secretions and excretions, and the changes in the skin, pulse, countenance, eyes, tongue, mind, and temperature of the patient.

5thly. Her education should embrace a knowledge: 1st, of the principles of hygiene, especially of ventilation, clean linen, temperature, and the nature and use of disinfectants; 2dly, of the methods of preparing food and drink; 3dly, of the administration of medicines and of the doses of the more common articles of the Materia Medica; 4thly, of the application of leeches, blisters, bandages and other dressings, as cataplasms, unguents, and lotions; and 5thly, of making up beds, changing sheets, and handling patients exhausted by disease and injury.

The Committee, in view of the importance of the subject discussed in this report, beg leave to offer the following resolution: *Resolved*, that a copy of this Report, authenticated by the signatures of the President and Secretary of this Association, be sent to the State Medical Societies of the different States of the Union,

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inviting their coöperation in the establishment of schools for the training of nurses for hospitals and private families, in accordance with the principles therein advocated.

S. D. GROSS, M. D., LL. D., *Chairman.*

The Committee desire to express their obligations for some of the facts contained in this report to John Croft, Esq., Surgeon of St. Thomas's Hospital, London; to Miss Merryweather, of Liverpool; Miss Probyn, of Dublin; Mrs. Jackson and Mrs. Baner, of Philadelphia; Dr. Cheever, of Boston; and, above all, to Mrs. Jameson, whose work, entitled "Sisters of Charity," is full of interest.

Since this Report was presented to the Association, a house for deaconesses has been opened in Boston under the supervision of Dr. Charles Cullis, whose connection with other institutions of a kindred nature is well known. The school is to be conducted upon the same principle as that at Kaiserwerth on the Rhine, although the plans of the founders are not yet fully developed.

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A PECULIAR APPEARANCE

OF THE

TONGUE IN MALARIOUS DISEASES.

BY

THOMAS C. OSBORN, M. D.,

OF GREENSBORO', ALA.

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A PECULIAR APPEARANCE OF THE TONGUE IN MALARIOUS DISEASES.

For several years it has been a cherished wish of mine to deposit in the archives of the American Medical Association a drawing and description of a peculiar appearance of the tongue in malarious diseases, but, until now, owing to a combination of circumstances, I have had no opportunity for accomplishing the purpose.

This desire was actuated by many good reasons, and, amongst them, I will enumerate apologetically—

1st. That the record of the Association is the most appropriate place for such a history.

2d. That the discovery is sufficiently important to entitle it to a place on such a record.

3d. My anxiety to specify, in a distinctive manner, the features which characterize the phenomenon.

And 4th. To assert unequivocally my claim to the discovery, because it had been told me that a German writer had appropriated the idea without allowing me credit for it.

My claim to the discovery dates August, 1851, at which time it was announced in the *Western Journal of Medicine and Surgery*—then published in Louisville, Kentucky—as an essay read before the Medical Society of Greensboro', Alabama, in the month of June preceding its publication.

The main points in that effort were: 1st, an attempt to describe a constant condition of the tongue, which I thought to be pathognomonic of malarial infection; 2d, to declare it an unquestionable evidence of periodicity in disease; and 3d, to urge its great value as a therapeutic indication, specifying quinine as the appropriate remedy; and giving a series of cases illustrative of the grounds upon which my conjectures were established.

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As a discovery promising such valuable results, the main portions of the essay were republished in quite a number of home and foreign journals, but owing to a want of clearness and accuracy in the description there given, it nearly failed impressing its merits upon public attention. I have seen a notice of it in only one of our standard text books, and that merely as a foot-note, under Malaria, in *Wood's Practice of Medicine.* It was taught by Professor Howard to his classes in the University of Virginia, and also by Professor Bemiss in the University of Louisiana, who likewise states that he was preparing to write on the same thing at the time my article appeared in print. The general silence of the profession, however, indicates plainly enough that I had failed to make it as impressive as the importance of the subject required; and I am determined that such a charge shall no longer find a lodging at my door.

During the eighteen years that have elapsed since I wrote that essay my opportunities for carefully observing the phenomenon have been as ample as I could desire, and to day I declare that what was once only conjecture is now unequivocal conviction; and that my youthful impressions, instead of paling by time, have become fixed as a venerated reliance upon the accuracy and veracity of its significant teachings. I am now fully prepared to assert its claims to public confidence and to specify its features in a more appropriate manner.

Through the skilful assistance of a lady friend I am enabled to exhibit a fair drawing of the malarial margins of the tongue and to direct attention to its distinctive characteristics.

The design is intended to represent the phenomenon in its most perfect development when the system is fully saturated with the poison, leaving the observer to infer its various shades of intensity, which are always in direct proportion to the amount of malarious infection. It will be noticed that the middle of the tongue is heavily coated with a dirty fur, which thins off towards the point, where the color of the papillæ can be seen pressing through the attenuated coating; whilst on the sides of the fur there are clean, smooth, depressed margins, having a bright red color.

The sides or edges of the tongue are flattened, pinkish, and traversed by sharp lines, creating the impression to the eye of the observer that the parts are crenulated, striated, corrugated, puckered, or crimpled—either term having a shade of appropriateness—but which, upon close inspection, will be found situated in the sub-

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stance of the tongue, leaving the mucous membrane even and smooth to both sight and touch.

It is necessary that I should dwell minutely in the description, as the terms employed imply a probability that the teeth have something to do with the crenated appearance, which is not the fact, as may easily be demonstrated in those cases of infancy, and of old age, where the teeth are not present to complicate the question. When the eye becomes familiar with the appearance, it will be found very different from the thin and tremulous tongue in low forms of fever, in which, by its great width, the teeth imbed themselves in its edges. And, on the other hand, the transverse lines are too closely set to allow the idea of dental implication.

The malarial margins begin forming, the moment the poison enters the blood, and continue steadily representing, by various shadings, the measure of the infection, as long as a particle remains in the system. That peculiarities of constitution may have important bearings upon it, rendering the metrical indication somewhat inaccurate, can be, in this, as in all other physiological phenomena, readily believed; but that the sign is ever totally absent when the toxæmia exists, is a proposition involving, in my estimation, too much absurdity to require any amount of serious reflection.

Hence, with this important sign alone, if there were no other evidences at command, we are enabled to verify the prevalence of malaria during the winter months; and, on the other hand, to prove the great length of time the poison may remain dormant in the system, the individual meantime apparently enjoying the best of health. It is my observation that this peculiar tongue may persist for years in persons residing in swampy districts, and become neither intensified by frequent exacerbations of fever, nor entirely dissipated by established convalescence.

The furred coating, as seen in the drawing, is not essential to the completeness of the picture, and is noticed at all only as the most common condition of the tongue, in either health or disease.

The color is, also, not unvarying, the identity of the impression being easily recognized under any complexion the tongue may be forced to assume.

Nor does the figure of the tongue modify or control the malarial feature in the least degree. On the contrary, it can be distinctly recognized under any of the various shapes to which the tongue is ever liable.

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It follows, then, that *smooth margins*, more or less wide, and *the slightly flattened and crimped sides, or edges*, constitute the pathognomonic indication of malarial toxæmia, whether the color be red, white, or blue; the centre clean, or furred; or under any configuration the tongue may assume in health or disease.

To account for this singularly truthful appearance, I have supposed that the peripheral extremities of the ganglionic nerves, which are distributed to, and regulate the insensible contractility of the capillary system, are the first to recognize the presence of the poison in the blood; as well, also, as the first and principal sufferers from its paralyzing influence. In this way, perhaps, the sides of the tongue which are so liberally, nay, extraordinarily endowed with a blended association of vaso-motor and sensory nerves, become perceptibly disarranged in conformation, the capillaries contracting their ordinary dimensions, and the fibrous network being allowed to stand out like linear intersections.

A shade of probability is given to this explanation by several physiological phenomena, amongst which I will only mention, first, that the papillæ of the tongue, always abundant and prominent in influenza, are much less so in those cases where the margins are marked by malaria; 2d, that the iris contracts strongly under the stupefying influence of opium; and, 3d, that the hearing is rendered morbidly acute under the partial anæsthetic influence of chloroform.

But, after all, I am not engaged in theorizing upon physiological perplexities, so much as in the statement of facts having pathological bearings, and, at the same time advocating the fidelity of an indicator, by means of which invasions of fever may be averted, or its malignancy controlled by appropriate medication.

Can it be that this interesting phenomenon is identical with, or dependent upon a non-fluorescent condition of the tissues? Bence Jones, Chalvet, or the Drapers may take the question, and make the most of it; but that the malarial margins of the tongue indicate, in an imperative manner, a necessity for the remedial virtues of quinia, is a proposition about which there is not a spot to lodge the smallest doubt upon.

Cases of fever, as well as other diseases, occur in the practice of medicine in which quinia is injuriously administered, basing the necessity for its use upon one or more of its reputed virtues; but in no instance have I ever seen other than beneficial effects from the remedy, even in extraordinary doses, when warned by the

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tongue that malaria—whatever that poison may ultimately prove to be—was lurking in the system as a predisposing cause of disease.

Indeed, it is an habitual expression of mine, that I hold the tongue responsible for the appropriateness of quinia, it matters not to what class the disease may belong, or what the character of the diathesis or idiosyncrasy with which the patient may be at the time endowed.

This will, no doubt, be considered fast riding on so small a hobby; but, until I have reason to suspect my footing, no change is likely to be made either in the order or direction of the journey.

It is very often extremely difficult, at the first interview with patients, to discern, with anything like certainty, the hours of exacerbation and repose, in cases of nervous and inflammatory diseases, where malaria is lurking in the background; and if the tongue was serviceable only in unmasking such cases, its value as a diagnostic sign would be incalculably great; but when at the same time it will afford an equally certain indication for a special and efficient remedy, thus divesting the disease of its greatest danger, and restoring to the vital powers all their recuperative energies; surely, we cannot easily over-estimate its intrinsic worth.

The following cases are selected from among a vast number, as illustrative of the important part played by malaria in different classes of disease.

Case I.—During the autumn of 1854, a young man of small stature and feeble constitution visited the Southern States for the purpose of warding off climatic influence in the development of phthisis pulmonalis, to which he was hereditarily predisposed, and towards an attack of which he seemed to be certainly tending. After residing two months in a paludal district, he was attacked with cough, hæmoptysis, pectoral distress, diurnal fevers, night-sweats, and finally diarrhœa. Several physicians in turn treated the case, all acting upon the conviction that tubercular maturation was rapidly progressing, and all concurring in the opinion that he would not live through the spring months. At last a comparatively young physician was called, who, finding the tongue distinctly margined and crimped, gave quinine in liberal quantities for several days, until the case cleared up, and then hastened convalescence by the free administration of the mineral acids, beef, porter, cheerful

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associations, and gentle shower baths after light suppers, until the patient was quite restored to his ordinary health.

CASE II.—In 1857, an epidemic dysentery prevailed extensively in Alabama, and many newly-made graves attested the foot-prints of the destroyer.

In my field of labor, a large majority of the cases exhibited unequivocal evidence of the malarial origin of the disease, and, in all of these, quinine was very serviceable in their remedial management.

A lady having a violent and protracted attack of this disease, called me some distance away, for the purpose of consulting with two physicians in attendance, who were nearly despairing of her recovery. On examining the tongue, I found, by the sides of the parched centre, broad red margins, and deeply crimped edges; and upon that indication of the malarial origin, or complication of the case, I based my advice to use quinine liberally, as soon as a period of repose in the violence of the fever occurred. The advice was accepted, and, after a few days, the case cleared up, little else being required to establish convalescence.

CASE III.—A valuable negro woman was sent to me from a neighboring county, in the year 1859, who had for three years an almost incessant issue of blood from the womb, in spite of the best directed efforts of three respectable physicians, under whose care she had been alternately placed. Surprised, as I was, to find no other morbid condition of the uterus than an inordinate paleness, I took the wide smooth margins, and deeply crimped edges of the tongue for my guide, and gave substantial doses of quinine, with tinctura ferri chloridi four times daily, and a cold shower bath after light suppers every evening. In one month the woman was restored to vigorous health, and has since had no return of the disease.

CASE IV.—An estimable lady had been afflicted with facial neuralgia for several weeks, although two intelligent physicians had resorted to well directed expedients for its relief. In March, 1861, she came under my care, and finding the tongue well marked with the malarial margins, I placed her upon the use of quinia, in combination with ext. belladonna, cyanuret of zinc, and sulphate

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of morphia, which relieved the pain very promptly, and there has been no return of the disease since that date.

CASE V.—A young man, in the year 1860, contracted virulent gonorrhœa, which, although the ordinary means had been faithfully administered for ten months, continued nearly unabated in the quantity of the discharge from the urethra; and there were three attacks of orchitis during the protracted time. His residence was in the neighborhood of an extensive switch cane marsh, but it had not at any time occurred to me to suspect malaria as a complication in the case, until the patient was attacked with intermittent fever, and then, as usual, I consulted the tongue, and finding it well marked with wide margins and crimped edges, for the first time I began to see my way more clearly. Quinia was immediately given for the fever, and continued several days after the paroxysms were arrested, for its full influence upon the local disorder, and in ten days all signs of disease had entirely disappeared—no local remedies being ordered in the mean time, as adjuvants in the treatment.

Cases of malarial complication, in almost all classes of disease, could be multiplied indefinitely, if I fancied those already given were not sufficient to convince the most skeptical reader that, whenever that poison is present, quinia is essentially necessary to the cure; and that the tongue, when well marked, is a faithful guide to its detection.

With the malarial margins before me as a delicate miasmometer, I have contended for the prevalence of malaria during our coldest winter seasons; successfully warned numbers of persons who boasted of good health, that they would be sick within a month, and predicted, truthfully, in the earliest part of the year, to my professional associates, that there would be a harvest of fever for them to work upon during the coming summer and autumn seasons. One of these gentlemen, indeed, who is now in my presence, being a little incredulous as to my correctness, asked me if the prospect of the crop was sufficiently flattering to get an advance of money upon from his commission merchant. To this question I replied affirmatively, the result proving my prediction, as to the epidemics of 1866 and 1867, perfectly correct, and affording to our investigation a new variety of malarial fever, which is at this time occupying, almost exclusively, the attention of the profession in Alabama, Mississippi, Arkansas, Texas, and Louisiana.

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My confidence in and reliance upon the malarial margins of the tongue as an indication of pathological, as well as therapeutical importance, closely resembles the character of feeling which actuated the defiant Cornelia, when exclaiming before her husband's persecutors, "Call me not the daughter of Scipio, but the wife of Sempronius, and mother of the Gracchi." In like manner, I can truthfully say, I am never so proud of the appellation of discoverer of the malarial tongue, as of the title of defender of its diagnostic accuracy, and interpreter of its remedial significance.

GREENSBORO, ALA., April 28, 1869.

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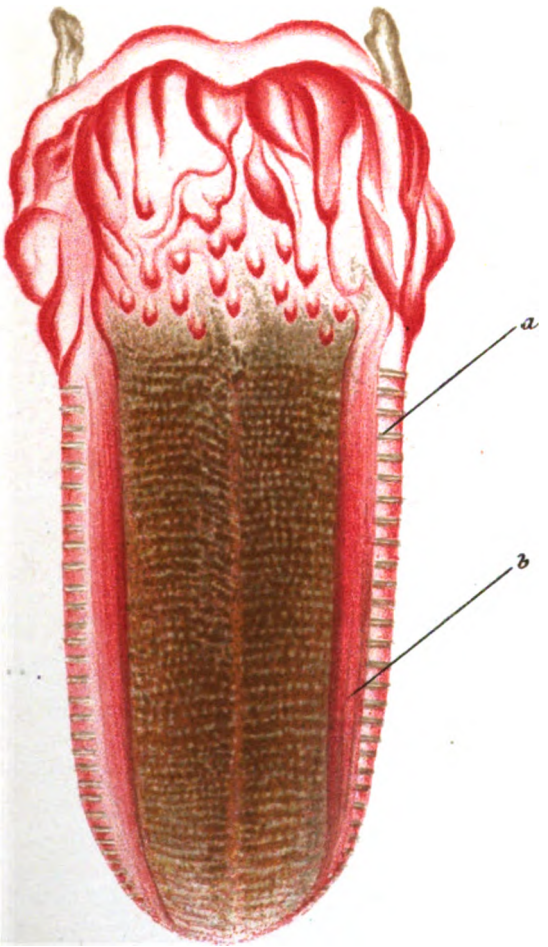

Peculiar appearance of the Tongue in Malarious Diseases.

a. Crenated edge.

b. Clean border.

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THE

PROPHYLACTIC AND THE THERAPEUTIC USES AND ABUSES

OF

QUINIA AND ITS SALTS.

A REVISED ESSAY.

BY

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THE PROPHYLACTIC AND THE THERAPEUTIC USES AND ABUSES OF QUINIA AND ITS SALTS.

It may not be uninteresting to the reader to know that the original paper, of which this is a greatly augmented edition, appeared in the *Transactions of the Medical Society of the State of New York for the year* 1862. Without entering into the detail of the provocation to which this edition is indebted for its preparation, it may be said that it has received the endorsement of a very distinguished body of medical men, which the author deems sufficient reason for offering it to the profession. He, therefore, does so with the single wish that it may contribute useful ideas to the present knowledge his brethren possess upon the subject.

The natural history of undisturbed disease, numerous and careful clinical observations, together with the teachings of properly conducted physiological experiments, are the only reliable sources of our knowledge of therapeutic value.

Following out the plan sketched in the title to this paper, its subjects have been arranged to treat, first—of the so-called prophylactic uses of quinia and its salts; second, of their uses in the treatment of miasmatic disease; third, of their uses in the treatment of diseases not miasmatic; and, fourth, of their various abuses.

It is in the first of these divisions that mankind finds his especial indebtedness to the various forms of the essential properties of the Peruvian bark.

In miasmatic disease its remarkable power has always been acknowledged from the days of the Countess de Cinchon to our own.

The manner of its administration is, however, quite as important to the final result as the peculiar virtue of the substance, and on account of want of knowledge upon this point, the Jesuit's bark has often suffered discredit in the hands of its advocates.

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But time and modern science have supplied these deficiencies, and to day the administration of quinia in miasmatic disease is reduced to an exactness almost mathematical.

Miasmatic poison, like all other malarial causes of disease, first infects, and thereupon follow the phenomena known as disease. To protect the economy from such an infection, as the vaccine disease protects from the infection of variola, is the first power in order and importance possessed by quinia and its salts. While the Jesuits, more than two hundred years ago, believed that the curing of a fever by the use of the bark effected a permanent protection of the person from future disease, we have no information that they knew or even suspected that the first attack could be prevented by it.

They probably had no idea of a prophylactic use of cinchona, as the term is used in modern times. Indeed, even now, when seen in connection with miasmatic disease, it is generally impossible to say exactly what signification the author puts upon the word *prophylactic.* Lexicographers define it variously, as "*a preservative or preventive;*" "*a medicine which preserves or defends against disease;*" "*any means made use of to preserve health and prevent disease.*"

As the usual manifestations of miasmatic disease permit a preventive treatment, even after the disease is established, to wit, prevention of the paroxysms, it becomes necessary to state, when speaking of the use of quinia as a prophylactic, whether its use to prevent infection is meant or to prevent paroxysms after infection. This measure is very rarely if ever adopted, so far as I know, by authors upon this subject, and the result is the most utter confusion as to the signification of the term in medical writings. Therefore, on account of this confusion so inseparably associated with it, I shall discard the term prophylactic altogether in this paper, and shall employ the word *protective* in its stead.

First, then, quinia and its salts possess the power of *protecting* the human system from *miasmatic infection;* and I regard this use of them as second, in point of importance and practical utility, to no other. Within certain limitations, which I shall define presently, this use of the medicine affords remarkably sure and highly valuable results. I have been aware of this fact since about the year 1852, but now disremember whence I obtained the idea; probably from some of the medical journals of the time.[1] At all events I claim no

[1] Baikie's Exploring Voyage. Quoted by Sanitary Commission Report, 1861, p. 17.

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originality in the matter. This protective use of the drug is, therefore, unquestionably a modern discovery, though its date is inextricably obscured by the "prophylactic" confusion of the contributions upon this subject. A careful perusal of these early contributions leads me to doubt if the protective power of the medicine was understood by their authors as a distinct property. For example, one of these authors recommends "that its use be continued, not only while the men were exposed in unhealthy localities, but for fourteen days after they had returned on board, in order that the antagonistic influence of the medicine might be kept up until the incubative period of the disease had passed."[1] Had he understood, what I believe to be the fact, that the drug has the power to protect from infection, I cannot see how he could have thought it necessary to continue its administration after the person had been removed from the poisonous exhalations. Again, another distinguished author says, "There is no prophylactic measure against the miasmatic fever at all comparable in efficiency to the use of this medicine. It seems reasonable to suppose that the same impression on the system which prevents the return of the paroxysm will prevent the occurrence of the first."[2] This is certainly logical, so far as preventing the paroxysms is concerned, but it will be observed that no allusion is made to the subject of protecting from infection. It may be a pardonable piece of egotism if, for the sake of illustrating this subject, I advert to my personal experience.

In the year 1851, I had occasion to take up my residence upon the Isthmus of Panama, a place which for its pestiferous miasm has few equals on the globe. I was exposed to its most deadly exhalations from the first day of my arrival, and within the first month I experienced convincing evidence that I had become infected with miasm. At about the end of the first month premonitions of a paroxysm of miasmatic fever appeared. Its development was prevented by the use of sulphate of quinia, as were very frequent subsequent ones for several years in succession. It is, therefore, true in principle "that the same impression which prevents the return of the paroxysms will prevent the occurrence of the first," as in my own case, though the infection may be thorough. This will suffice to explain why I have doubted whether the *protective* use and power

[1] British Navy Report, No. xv., Bryson, M. D., R. N., and Sanitary Commission Report on Quinine, 1861.

[2] G. B. Wood, M. D., Materia Medica, and Joseph Jones, M. D., on Quinine as a Prophylactic.

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of quinia have been well comprehended by any of the early writers upon quinia, as a so-called prophylactic.[1]

Having now illustrated the meaning of the term *protective* use of the medicine in question, I will proceed to the consideration of its application in actual practice. The emigrant to miasmatic localities is the subject upon whom this *protective* use of the medicine is to be directed. It is he who is liable to suffer that form of miasmatic disease known by the various names *remittent, bilious remittent, climatorial, acclimating, climatic, climate fever,* and—as I prefer—*first miasmatic fever.*

This is *the* fever which is regarded with such terror by all who visit the tropical regions of either America or the old continent, and, consequently, it is of paramount importance for such persons to adopt the means to escape this particularly dangerous *first miasmatic fever.*

This escape can be secured then by the proper protective use of quinia and its salts. The very natural query here arises, *how long will it protect him?* This is a more difficult question to answer than may by many be supposed; the chief difficulty in the way being, that few persons will submit to an interminable drugging, practised as it must be in an experiment of this character while the subject is in perfect health.

This has been an insuperable difficulty in my experience, and I can therefore only say in reply to this query that I do not know.

Be the limit, however, what it may, I have reason to believe that we can rely upon the protective powers of the medicine for any period *within sixty days;* and this is long enough for any practical purpose, for the following reasons, viz: The first mias-

[1] Dr. Joseph Jones, in a very good paper on the subject of the Prophylactic use of Quinine, published in the *Nashville Journal of Medicine and Surgery*, 1867, makes the following statement, viz., "Quinine taken during exposure to the exhalations of miasmatic regions will, in most cases, ward off fever entirely."

Dr. Roberts Bartholow, in his elaborate prize essay published in the *Transactions* of Connecticut State Medical Society for 1868, treats this subject of the protective use of quinine superficially, under the heading of "Prevention of Malarial Poisoning," p. 96. He asks, "Does the habitual use of quinine confer absolute immunity?" and finally answers his own inquiry by advancing the rule that "quinine is a prophylactic, but power declines with use."

The essay of Dr. Bartholow, for one upon the "Therapeutic Uses and Abuses of Quinine and its Salts," is, like most of his papers, meritorious, but certainly a remarkably discursive one. Though much less practical than that of Dr. Jones, above referred to, it has much scientific and literary merit.

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matic fever observes the same law as that followed by yellow fever, that is, the longer one resides in the locality where it prevails the less liable he becomes to it, so that while in the case of yellow fever he may escape altogether as respects the fever in question, though he may, at a later date, suffer mild paroxysms; if he pass a month or two in the locality before suffering fever he escapes the first violent climatorial attack. Therefore, any measure which protects him for from one to two months, carries him over the danger arising from the climate fever, so that if quinia protects him certainly for this one or two months, there is no practical utility in administering it longer as a protective, the process of acclimation thus secured rendering all subsequent febrile attacks comparatively mild and devoid of danger.[1] In this connection I deem it a duty to remark that I by no means regard this protective use of quinia as always necessary to secure this time and acclimation, however concentrated the poison of the locality may be. Many persons acquire them with no aid from the art of medicine. Some favoring circumstance, such as removal from the infected locality during hours of sleep, short periods of exposure at long intervals, or some peculiar resisting force of constitution may carry one along for months, and thus by acclimating him secure a mild form of fever. Nor have I ever seen any reason to believe that the mere administration of this medicine exerts any influence upon the character of the first miasmatic fever, unless it has prolonged the residence before the first attack and secured the acclimation of the person. The doctrine, therefore, so much advocated by high authority, "that if quinia have not the power of always *arresting* the paroxysms it will always render the disease milder,"[2] is only true conditionally, the condition being that it protects sufficiently long to secure acclimation. Were not this the case, persons dosed with this drug for a time before exposure would have a mild miasmatic disease whether it were continued during the exposure or not. This is not in accordance with my experience.

[1] Dr. Jones alludes to this fact in the following language: "Under these exposures I have found that sulphate of quinia taken in three to five grains twice during the day would, in most cases, prevent the occurrence of malarial fever, and if it failed to ward it off entirely, the attack would be of a very slight character."—*Op. cit.* A similar view is taken by authorities quoted by the Sanitary Commission. Dr. Bartholow, however, does not offer any remarks upon this important point, though he quotes Dr. Jones' conclusions to this effect.

[2] Sanitary Commission's authorities, *op. cit.*, Dr. Jones, *op. cit.*, and others.

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A converse truth to the foregoing statements is, that whatever the quantity of quinia taken, should the person not be protected thereby, and the fever notwithstanding come on early, it will be in every respect a true acclimating fever.[1] In support of the truth of these propositions, I may remark that during the later years of my residence in the tropics, when I saw a recently arrived person pass thirty or forty days' exposure without symptoms of fever, I could predict, with great certainty, that his first paroxysm of fever would be mild.

The protective power of quinia and its salts against miasmatic infection having been established, at least for a limited period—but, as we have seen, sufficiently long for purposes of safety—I now come to the inquiry as to the quantity of the medicine required to effect this result, and the plan of administering it. My experience with sulphate of quinia in the treatment of developed miasmatic fever taught me that a quantity too small to produce a sensible impression upon the nervous system cannot be relied upon to prevent the paroxysms.

Why, I asked, if the physiological phenomena of the medicine are requisite to insure against the occurrence of the phenomena of disease, need we expect protection against the poisonous impression of miasm by a less quantity of the antidote, by a quantity too small to monopolize, so to speak, the economy.

If the salts of quinia are antidotes to miasmatic poison, and I do not doubt that they are, the very principle of antidotes would require that the economy be preoccupied by an antagonistic influence. The recent brilliant discoveries of Bence Jones throw an important practical and theoretical light upon this subject.[2]

Having unexpectedly fallen upon the fact that the tissues of the bodies of both man and the lower animals always contain a quinine-like substance, he, after an elaborate comparative analysis, concluded that this "so-called animal quinoidine is descended from albumen, and its ultimate progeny are carbonate of ammonia and water, out of which substances the cinchona tree, under favorable circumstances, is able to build up quinine $C_{40}H_{24}N_2O_4$." He goes on to observe that "from the large number of carbon-atoms in quinine, it may be regarded as one of the early substances pro-

[1] See an illustration of this fact in Hayne's report, quoted by the Sanitary Commission, *op. cit.*

[2] Medical Times and Gazette, August 18, 1866.

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duced in the downward passage of albumen, and from this we shall very probably find the key to the question how quinine acts in the body;" and thinks it probable that "it causes a stoppage of the fresh formation of quinine from albumen," that is to say, prevents the abnormal destruction of albumen.

He then propounds the following queries upon the admission that a quinine-like substance exists in a fixed proportion in the tissues in health, viz: "Can the rapid destruction and removal of this substance through the action of marsh miasm give rise to ague?" "Does quinine cure ague by furnishing a substance which retards the changes which go on in the textures?"

Whether future discoveries may or may not verify these suspicions, this distinguished observer has certainly not said too much of the importance of this advance when he says that "these experiments give hopeful prospects of future discoveries."[1]

The reasonings above stated led me to the conclusion that whether administered for the object of preventing paroxysms, or for the purpose of protecting from infection, a decided and sensible impression must be secured; and when given for the latter object, this impression must be continuous during the hours of exposure. These principles, I think, can hardly be controverted; they are surely founded in truth, if I may judge from the results of my experience in practising them. Now such an appreciable and protective impression of the medicine, is produced by from three to six grains given in the form of the powdered sulphate.

I usually gave four to five grains, and increased or diminished it as the individual cases seemed to require. I became satisfied that, as a rule, once in about twelve hours is sufficiently frequent to repeat the dose, though cases are not infrequently met with who are perfectly free from all signs of quininism in eight hours, and consequently require their doses more frequently, that is, once in eight hours.[2] My conclusions upon this point, arrived at through

[1] Dr. Bartholow quotes extensively from these observations of B. Jones, and from those of Dr. Rhoads, and Dr. Pepper (*Penn. Hospital Reports*) on the subject, and very justly concludes that "these investigations only furnish us an explanation of a method; they do not add to our means of cure. So far as the therapeutic uses and abuses of quinine are concerned, they do not extend the boundaries of existing knowledge; but the least practical fact of science, is of the origin of most important results."—*Op. cit.*, p. 112.

[2] This subject of the intervals between the protective doses of quinine has been too generally overlooked by writers. Dr. Jones expressly states that twice a day is the period he was accustomed to recommend it. Dr. Bartholow I am surprised

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clinical observations purely, have received very remarkable and unlooked-for support from the experiments of Bence Jones already alluded to. He discovered that in fifteen minutes after the administration of a dose of the sulphate (in solution as is supposed) it reaches every tissue of the body; that in three hours the maximum effect may be reached, though that seems to vary between three and six hours: that at the end of twenty four hours, more than half of it has passed off; in forty-eight hours, but few organs and tissues retain any of the substance, and at the end of seventy-two hours, no trace of it can be found anywhere.

It will be observed that this experimenter makes mention of no record at the end of twelve or eight hours, but from the fact that somewhat more than half only of the substance had disappeared at the expiration of twenty-four hours, it would seem reasonable to suppose that the diminution from the maximum at six to the twelfth hour would not be very great, that it would still be in sufficient quantity to exert its counteracting influence against miasmatic poison, as in fact is the case. This is a very remarkable example of physiologico-chemical demonstration of clinical deductions.[1]

Regarding the action of the medicine upon the miasmatic poison as antidotal, as indeed completely neutralizing, I could see no reason for continuing the remedy after the imbibition of the poison had ceased, and I followed the practice of discontinuing its administration at once that the person was removed from the miasm. The result was a uniform exemption from infection. I now incline to the belief that, while a sufficient quantity of quinia is present in the tissues, the destructive effect of the miasm upon the albuminous substances of the textures, as supposed by Jones, is prevented, and

to see, makes no allusion to it, but states that five grains per day is the "minimum allowance," which I know if given at intervals of twenty-four hours will not protect.—*Op. cit.*, page 100.

[1] Dr. Bartholow has offered some "new observations" upon this subject of the rate of elimination of quinine from the tissues and cavities. Like John Hunter and Magendie, he employed the peritoneal cavity for this purpose, as well as the stomach and the subcutaneous areolar tissue. The amount and rate of elimination of the substance was estimated upon the amounts found in the urine at various periods after its introduction into the system through one or other of these localities. Any one who will read his account of those experiments, will no doubt be impressed with the truth of the author's remark, that such experiments are "exposed to many sources of fallacy" and therefore of little value.—*Op. cit.*, p. 113.

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no poisonous results ensue, and that once thus prevented, the poison never again becomes active.

As to the antidotal properties of quinine against miasmatic poison, much observation has convinced me that it has no such properties of a chemical character; such, for example, as the alkalies exhibit against the acid poisons, or iron against arsenic; but that its powers are manifest in a purely physiological manner, like alcohol, for example, against the various depressing causes seen in disease, or like belladonna against opium. Upon no other supposition can I account for its transitory power, its tendency to diminished influence when continuously employed, its invigorating effect when given in erysipelas and in other septæmic diseases, and its occasional failure to arrest well-marked miasmatic affections. It would appear to be a specific stimulant; while its action is going on, the self-protecting powers of nature are exalted, and the person is thereby placed on a level with those rare ones who are able to live months and years in a miasmatic atmosphere, without the assistance of medicine, persistently throwing off its poisonous influence.

There does not appear to be any evidence that quinine has the power to chemically neutralize miasmatic poison. The condition known to some as "Chronic Malarial Poisoning" (Bartholow, *op. cit.*) thoroughly tests this question. It is a well-known fact that a person once infected with miasm, is liable to an occasional paroxysm of fever during the remainder of life, and that no amount of quinine or other medicinal substance will eradicate this diseased condition. Therefore, to speak of giving small doses of quinine "at suitable intervals to neutralize any malarial poison still present in the blood," is to employ language of very doubtful meaning. (Bartholow, *op. cit.*, page 109.)

Quinine never probably does anything more than to temporarily augment the vital energies. When, therefore, I speak of quinine neutralizing miasm, I only mean that it prevents it acting, by stimulating the vital energies to a most effectual resistance of the depressing influence which the poison or cause of the diseased action is exerting at the time.

There is therefore, as I believe, no necessity for the medicine after exposure to miasm is discontinued. The experiments which led me to these conclusions, though extending over a number of years, would have been less convincing, but for the fact that an occasional

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self-willed person declined to take the protective dose, on the ground that people who are well require no medicine. A single case in illustration must suffice.

During the year 1856, a vessel arrived at the port of Aspinwall with a crew who had never been exposed to the causes of disease in that or in similar localities. Among their number, three refused to take the protective dose of quinine. After remaining at the wharf about three weeks, the vessel sailed, and these three persons, and these only, were taken ill of fever on the voyage to New York. This I adduce as a sample case of those which occurred in large numbers under my observation, and whose results compelled me to accept them as effects of the measures adopted, and not mere coincidences.

This I did with a full understanding of the behavior of miasmatic poison upon a promiscuous population. I had seen many persons exposed to miasmatic atmosphere for weeks in succession, without ever suffering a single symptom of miasmatic disease as a consequence, though they did not take a particle of protective medicine. And on the other hand, I had seen persons thoroughly infected by an exposure of a few hours only.

Now, while I admit that many of the persons to whom I gave quinine as a protective, would perhaps have escaped the infection and disease, without it; I firmly believe, that those who suffered, would have been protected had they obeyed instructions, by taking the doses as prescribed. I am particularly desirous of avoiding the error, by far too general among writers upon this subject, of totally ignoring the *vis medicatrix naturæ* in this matter of protection against miasmatic poison, and of attributing the salvation of even a few to the powers of the medicine given. As an illustrative case of this kind of neglect to give nature her due, I will quote the points of some cases published by the Sanitary Commission from surgeons of the British Navy.[1]

"On the morning of the 25th of November, seventy-seven men of the ship went up the river Lagos to attack the town. Before starting, every officer and man was ordered to take a glass of quinine wine, and a sufficient quantity was put into the boats to repeat the same at night; all, to my knowledge, took it, with the exception of the master's assistant, who rather plumed himself on having

[1] Sanitary Commission on Quinine, 1861.

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escaped taking a dose of physic. Just a fortnight after, this person was seized with a violent attack of remittent fever, and up to nearly one month later, he was the only one who had been attacked." We are not informed how long this party of seventy-seven persons was exposed, but it would seem from the tenor of the report that the time was about twenty-four hours. If this be true, I cannot deny the possibility that this man was infected during this short exposure, but if so, he was a remarkably susceptible subject. I do not think it at all probable that another one of this whole party would have suffered infection upon so short an exposure, even if they had not taken the quinine wine. The inference drawn by the author, therefore, that they were protected by it, is, in my opinion, without support. It seems to me very likely that a more careful inquiry into this infected person's history would more fully explain why he suffered fever two weeks after this particular exposure.

In the same publication will be found the following so-called "instance of the beneficial influence of quinine as a preventive of coast fever."

"The boats were dispatched with thirty-two officers and men up the Ponga River, and remained there two days and nights; one ounce of the quinine wine (four grains of amorphous quinine, equal to two grains of sulphate of quinia to the ounce) was given daily to each person. Between the twelfth and fourteenth day after leaving the river, four slight cases of fever occurred. In another instance the boats were away with thirty-four officers and men for seven or eight days, and each took a dose every other day only, during the time. Of these thirty-four, seventeen were afterwards attacked with severe remittent fever." To show how beneficial he regarded the use of the quinine in the case of these thirty-four, he adds the instance of two persons, who after living on shore for the same period of time (seven or eight days) without taking any quinine, both suffered fever of the same character, in proof, apparently, that but for the quinine, the whole thirty-four would have suffered fever.

No one, it seems to me, with any knowledge of the natural history of miasmatic disease as manifested in the human subject, can regard this account as affording the least evidence that the quinine given exercised any influence one way or the other. In the first place the quantity was insufficient, and in the second the intervals were too great for any medicinal quantity to be useful. There is,

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therefore, not the least probability that one of the whole thirty-four was protected by the medicine he took.

The result was certainly much worse than that from the former similar exposure along the Chagres River, of so many thousands of our countrymen, who took no medicine at all.

The old isthmus transit used to occupy from one to four days, yet the persons who contracted fever never amounted to twelve and a half per cent., as in the first thirty-two of this case.

The most remarkable part of this report, however, is the conclusion drawn from these cases, exhibiting, in a striking manner, the liability to delusions among physicians. He says, "it is not to be presumed that quinine will prevent the occurrence of fever in every case, but in a sufficient number to be of the utmost benefit, and the fever occurring in those who have employed it as a prophylactic, is sure to be of little moment;" and yet he tells us that fifty per cent. of his cases had severe remittent fever after exposure of one week only, though taking his "prophylactic" all the time.[1]

I submit that these histories simply go to substantiate what I have already stated, that there is a great difference between individuals in their power of resisting the depressing influence of miasm, some doing so many days, as we see in the case of the thirty-four men, half of whom only fell ill after an exposure of seven or eight days, while others became seriously infected with an exposure of a day or two. The inference that the quinine given had any notable effect in producing the results, is without support. It is an error of judgment arising from ignorance of the natural history of miasmatic poison and disease.

I believe that I weighed this point with due care during the investigations which convinced me that quinia and its salts will protect from miasmatic infection.

We have thus far treated of these substances as applicable to the permanent resident in the unhealthy locality; but their protective power will often be of the utmost utility to the transient resident who may by its aid enter the poisonous atmosphere, remain a few days or a few weeks, and then leave with no apprehension that he carries with him the infection which sooner or latter will develop into disease. The plan of its administration to such a person is the same as to the permanent resident. I regard it possible to protect such a person from miasmatic infection for sixty days,

[1] Sanitary Commission Report, p. 14.

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during continuous exposure, but how much longer. I, as before stated, am unable to say.[1] It may be an illimitable period for aught I know, the control of the substance over the destructive tendency of miasm upon the albuminous tissues, never being lost. We do not know, however, that this is so, and therefore where a residence is to be longer than two months, I can see no useful purpose in running the risk of losing the influence of the medicine, which will be so essential when the treatment of the developed disease is required, an emergency that we do not know can be escaped. The various published reports touching the permanency of the influence of this medicine, throw no light upon this point, for they all refer to its action as a preventive of paroxysms, and not as a protective against infection. It may be inferred from what has already been said—but I do not wish this point left to inference—that intermissions in exposure I regard as equivalent to a dose of quinia during twelve hours that each intermission lasts, and as a more desirable protective than any other, when it can be practised, all use of quinia and its salts meanwhile, being suspended. Whether so much of the medicine as will produce its physiological symptoms, is actually necessary to secure the protective effect, is a matter of much uncertainty. I have preferred to err upon the safe side, if it be an error, and have always aimed at producing some of the recognizable signs of quininism, regarding those signs as essential indices of the thorough occupation of the economy by the protective agent.

The practical summary from the foregoing propositions and arguments is as follows:—

When the exposure commences, give at once three to five grains of the medicine, and repeat the dose once in twelve hours, during the continuance of the exposure, if such exposure is only to be temporary. But if it is to be prolonged, the medicine need not be given as a protective for a longer period than thirty days. By temporary exposure, is here meant any time less than sixty days.

It must not be forgotten that cases are occasionally met with which require the dose once in eight hours, in order to keep up the symptoms of the medicine, symptoms which should be carefully watched for and maintained in all cases, as they are the only guarantee that the medicine is exerting a protective influence. The

[1] See p. 190.

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medicine may be suspended with the discontinuance of the exposure.

A removal from the miasmatic atmosphere, especially during the night, is equivalent, as a protective, to one dose of the medicine for each twelve hours that such absence continues; it may be much more economical, and when practicable, is a most valuable protective measure. When circumstances will permit such frequent removal from exposure, and consequent suspension of the use of the protective, its efficacy as such will thereby be indefinitely prolonged, so as to be available as a protective for years in succession.

QUINIA AND ITS SALTS AS A PREVENTIVE OF PAROXYSMS OF MIASMATIC FEVER.

We are now prepared for the discussion of the second great and inestimably valuable use of quinia and its salts, viz., the *antiperiodic, anti-paroxysmal*, or *preventive use.*

It will be borne in mind that the directions heretofore given, with the view of protecting the system from miasmatic infection, only contemplated that use of the medicine for a period of about one month, for the reason there given, and then to allow the miasmatic poison to take its usual course and time. We need not here return to the consideration of the possibility of perpetual protection, for practically it is as a system impossible, if not so under the most favorable circumstances. If the permanent resident be protected so long as to save him from the climate fever, he need not have any apprehensions for the future, providing he retains a susceptibility to the influence of these salts; and this he will retain, if he allow an interval of some days or weeks to elapse between his continuous protective use of the medicine, and the appearance of the first paroxysm. There can be little doubt that, whatever the essential condition, known as miasmatic poisoning, may be, quinia and its salts may lose their control over the disease that miasmatic poisoning produces. So far as my experience qualifies me to judge, I should say that this insusceptibility is rarely, if ever met with, except in persons who have been dosed more or less continuously and excessively. I therefore believe that if we desire to preserve acute sensitiveness to the impressions of this

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drug, that frequent and considerable intervals of abstinence from it must be practised.[1]

In miasmatic regions it is no very unusual thing to meet with cases of intermittents, in which quinia and its salts are apparently inert. I have seen the paroxysms return with great regularity, notwithstanding the patient's ears were ringing from quinia. This, however, always occurred in cases who had been more or less continuously taking the medicine up to the time the paroxysms appeared. Upon this point, as well as upon some others, my final conclusions were based more on observation in my own person, than on the statements of others, because the data were positively known; a point often surrounded by doubt, if the statements of others be taken.

A long period of the preventive use of the medicine in my own person, convinced me that its daily use may be continued for long periods, perhaps for months, without impairing the susceptibility to its action, providing but a single dose be taken daily, that is to say, if the decided action of the drug be kept up for but eight to twelve hours daily. The respite thus secured the nervous system, appears to restore its tone and susceptibility, and on the succeeding day the dose seems as active as any of the preceding ones.[2]

During the six years that I was in the tropics, I had very frequent occasion to take quinia as a preventive of paroxysms, and I can therefore speak from knowledge, that so far as the signs it produces are concerned, I never discovered the least diminution in its activity upon me; but let it be remembered that I rarely took it more than three days in succession. In addition to its maintained activity as regards its symptoms, its successful prevention of the paroxysms in my own case, for years, testifies to its therapeutic activity also. It would seem that there is a clear distinction to be drawn between the physiological and the therapeutic action of quinia and its salts. The former may always be obtained, as manifest by its signs; such as ringing of the ears, though the therapeutic action may not follow. As the latter is the action which is prac-

[1] See p. 195.

[2] This does not accord with Dr. Bartholow's conclusions, which are that "an additional grain a day should be added every week," to secure an equable effect. (*Op. cit.*, p. 100.) The whole tenor of my experience affords no support to this purely theoretical speculation. I regard the doctrine unfounded, and dangerous. There is no permanent certainty of protection, with whatever increase of the dose.

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tically essential, clinical experience can alone instruct us how to obtain it.[1] The anti-paroxysmal use of these agents is the especial field for this therapeutic inquiry. Of all the uses of these salts, there is none into which one will run so readily as this preventive use. Indeed, a knowledge of the premonitions of the paroxysm of miasmatic fever leads one who understands its power to control the developed disease, almost as a matter of course, to its use to prevent the paroxysms.

The commonest minds often originate the query, Why quinia would not stop the fever, if taken when its coming is foretold, by pains in the bones, etc. Without having been taught this use of the medicine, the first idea which suggested itself to me, upon experiencing, at the end of my first month's residence in the miasmatic locality, symptoms which I regarded as premonitions of an approaching fever, was to take quinia. It is almost an intuition—as it appears to me—so far as the taking of the substance goes; but this cannot be said of the matter of time and quantity.

For the purpose of illustrating this point, I will venture again to draw upon my personal experience. Feeling what I regarded as the premonitory discomforts of my first miasmatic fever, I took eight grains of powdered sulphate of quinia, which soon began to manifest its action by ringing of the ears. The premonitory signs of the fever all disappeared within six hours. As a precautionary measure, five grains were taken as soon as the effect of the first dose seemed to be passing off; and so on for the two following days, the effect of the medicine was maintained by an occasional

[1] At the close of a somewhat prolonged disquisition upon the physiological effects of quinia, illustrated (?) by experiments upon himself and upon animals, Dr. Bartholow remarks that "there is an apparent contradiction in the therapeutical and physiological effects, as respects the influence in the retrograde metamorphosis of tissue. It was asserted that the quinia administered for the cure of malarial fever promoted oxidation of tissue, and the conversion of uric acid into urea. Administered in the physiological state, we find that imperfectly oxidized products accumulate in the blood. This is not a real contradiction. In the one case animal quinoidine being deficient in the textures, and in the other, being in excess, the normal metamorphosis is disturbed, and imperfectly oxidized or immature products are the result. When, in malarial fevers, the animal quinoidine is raised to the normal standard by the ingestion of quinia, tissue changes take place more perfectly." (*Op. cit.*, p. 119.) Any one who will take the pains to read the accounts of the experiments which led this author to this conclusion, can hardly fail to be convinced of their unsatisfactory character, and of the propriety of his remark, that it is difficult to make such "observations free from sources of fallacy." (*Op. cit.*, p. 118.)

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five-grain dose. This part of the management resulted from knowledge of the quotidian and tertian habits of the disease. Persons who do not possess such knowledge, need instruction upon this point, else they may be careless in providing themselves with the means of repeating the preventive dose on the second and the third day, and consequently would often suffer an attack of fever as we shall see presently. Two weeks after these my first evidences of infection, and the first prevention of paroxysms, the same premonitions were repeated. I then concluded to take smaller doses, and repeat them as often as might seem requisite. I accordingly took five grains of the sulphate in powder, and experiencing no relief from the pains and other signs, I repeated it at the end of two hours. An hour after the second dose, my ears began to ring, and simultaneously, all of the premonitory disturbance vanished, and I felt perfectly well. At the first and second quotidian period I took a dose of five grains, as a matter of precaution, though I felt no symptoms of disease. This fact of feeling so perfectly well immediately after breaking up a paroxysm of fever in its incipiency, was so uniform, that I soon discontinued the precautionary doses altogether in my own case. I do not desire to be understood as saying that I did not often take a dose for two or three days after; but that all doses were taken, only when indicated by actual symptoms, so that if there still remained signs of miasmatic disturbance the following day a dose was taken, if not it was omitted. I extended this practice among all classes of men with results entirely satisfactory. It is, however, a safer practice as a system, to give precautionary doses for two days subsequently to the one on which the premonitions appeared. Large numbers of persons are, however, so observing and intelligent, that they can be trusted to decide upon the symptoms they may feel, whether such dosing may be necessary, and they therefore should always be provided with the medicine and the proper instructions for its use. This general plan I followed throughout my residence in the tropics, having in my own case, on some occasions, to increase the quantity above mentioned, largely, and again on other occasions somewhat less would be sufficient.

On one occasion, during the rainy and sickly months, the period of the year during which the vitality in those regions is reduced to its minimum, I felt the usual premonitions, and took five grains of the powdered sulphate, but as the time for the second dose approached, every symptom having become more urgent, I took ten

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grains more within two hours. On account of the persistence of the premonitory signs, I found it necessary to take three other ten grain doses within the following nine hours before I felt free from them; having taken in all thirty-five grains within eleven hours from the first appearance of the premonitions: and yet no more had been accomplished than ten grains had always done before, nor than even five grains had frequently effected.

By following this plan, I prevented the occurrence of paroxysms in my own case, for four years, the recurrence of the premonitions varying at intervals from a week to a month or more. Indeed I had but one paroxysm in more than six years' residence in the country, and that one was deliberately allowed to come on, with the view of demonstrating that the symptoms which had been treated for four years as premonitions of miasmatic fever were really such.

The principle of this use of the medicine, it will be seen, is to be governed in the time of its administration, as well as the quantity given, by the appearance and the character of the premonitions. As a rule, the paroxysms can be prevented by this plan with five-grain doses given at intervals of two hours. Should these symptoms become more urgent after the first dose, instead of lighter, at about the hour for the second dose, the quantity should be proportionably increased. It will be recalled that in one instance in myself, the quantity was doubled.

Though the rule is, that the required quantity be taken once in two hours till relief is experienced, the practical result is, that not more than two doses will generally be needed.

The interval between the preventive doses above mentioned, I fixed upon as a result of observation upon my own person; it appearing very clear to me that all the effect I need look for from a dose of the medicine would be that experienced before the end of the third hour. Hence the rule of once in from two to three hours.

The experiments of Bence Jones, already quoted, demonstrate the truth of these deductions. It will be remembered that he found the quinine in all parts of the body fifteen minutes after it was taken into the stomach, and that he found the maximum amount at three hours. From this it naturally follows that a dose of quinia whose maximum effect will prevent a paroxysm of fever, should not be given more than three hours before the expected attack, and for the same reason it should not be given any later than

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three hours.[1] This being the fact as to the time we are to look for the maximum effect of the medicine, we are next obliged to apply it to meet the requirements of actual practice in which the paroxysm against which it is directed is not by any means always announced by premonitions, nor is it at all certain to return at the same hour of the day. To meet the former difficulty, I know of no better plan than to avail ourselves of the well-known habit of miasmatic disease of recurring at seven-day periods, or some period of which seven is a multiple. I have little doubt that I have often carried this class of persons along for months with perfect exemption from fever, by administering a full dose of the medicine on the seventh and eighth days.

In regard to the second difficulty, it seems hardly necessary that any statement of practice need be made, so evident is it, that to meet any known or feared anticipation of the paroxysm, a corresponding anticipation in the administration of the medicine must be observed. However, to meet this contingency, it is my custom to advise the patient to take the preventive dose six hours before the time for the expected chill, so that if it anticipate three hours, he will still have had sufficient time for the full action of the medicine, before the attack comes on, and, if it do not so anticipate, the effect will, as we have seen, still be near maximum at the sixth, or same hour as the previous attack. To provide for all of these points, I followed the practice of giving two doses for the prevention of an expected paroxysm, one of four to five grains six hours before the time for the appearance of the chill, and another similar dose at three hours before. I, however, found that among that class of persons whose duties keep them out of doors, and much exposed during the day, a ten-grain dose of the sulphate six hours before the paroxysm, is a much safer amount than two five-grain or six-grain doses at different periods, and it is certainly much more convenient.[2]

[1] Dr. Bartholow states that the maximum effect of quinine is attained in about five hours, though one of his tables shows it at six hours and the other at three hours. (*Op. cit.*, p. 102.) Also p. 194.

[2] Dr. Bartholow disposes of this matter of the time and the quantity of quinia to be observed, and to be given for the "cure of an intermittent fever," in a very mathematical and summary way. He regards twenty grains as the amount required for an intermittent, and thirty grains for a remittent fever, though he admits that double this amount may be required, that, in fact, the amount is a very uncertain thing, after stating that "a certain quantity is required to cure." (*Op. cit.*, 101.)

On the same page he makes the following remark: "A great deal of wisdom has

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This is true particularly in cases of treatment of premonitions of an approaching chill, where no paroxysm has been suffered for an indefinite time before. By this plan a person of the class above mentioned who begins the day with the premonitory signs of an ague, will almost invariably get through the twenty-four hours without fever, if he take a ten-grain dose before leaving his house in the morning; whereas if he take only a five-grain dose, and carry with him five grains more, to be taken according to instructions or his own discretion during the day, he will not unfrequently return before night with fever.

Persons who are under constant observation, can usually be treated with much smaller doses. All classes of persons are easily instructed to look out for these premonitions, indeed few persons need any instructions, for their own observation has taught them

been expended in endeavoring to determine the time and the doses in which the necessary quantity of quinia must be administered, in order to secure the best results. Strange inconsistency! To admit the antidotal power of quinia, and to be perplexed, whether it is best to administer it in small doses during the interval, or in a single large dose before the expected paroxysm, or in the sweating stage." Still, he falls into this same inconsistency, by directing that the dose should be given five hours at least before the expected paroxysm, and that twenty grains is the requisite dose. He advances the doctrine that, whether this dose is given in the midst of a febrile paroxysm, or at the above-mentioned period before it, it is equally effective in breaking up the attack—a doctrine which is contradicted by all my experience, and therefore, in my opinion, is generally unfounded, and a decidedly dangerous doctrine to adopt. He adduces in its support the history of a case in which a twenty-grain dose of quinia was given at the commencement of the febrile paroxysm, with the alleged effect of "preventing the normal evolution of the fever." This he regards as the "*experimentum crucis*," in proving the truth of this doctrine, because "the patient had no return of the paroxysms." This may be "a typical case" of this kind of cases, but in my experience with miasmatic disease, this kind of case rarely occurs. If this twenty grains of the medicine had arrested the paroxysm, as is supposed, I cannot understand why the patient should have commenced to sweat at seven hours, and continued to sweat, more or less profusely, up to ten and more hours after the commencement of the fever. In my experience, patients do not sweat profusely from the effect of quinia, which prevents the development of a paroxysm of ague. (*Op. cit.*, p. 102.)

Both physiological experiment and properly-conducted clinical observation definitely establish the fact that no medicinal quantity of quinia will exert a controlling influence upon the economy, against paroxysms of miasmatic fever, for a longer time than about twelve hours. Therefore, if ten or twenty grains of quinia are taken in the sweating stage of a quotidian ague to-day, the daily paroxysm will, as a rule, return to-morrow, the cases in which such return is not observed being quite the exception. This I have seen demonstrated in thousands of cases. I disagree, therefore, with Dr. Bartholow in toto upon this point.

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their significance. Supposing them so learned by observation or by the teaching of the physician; it is safe, and good and advisable practice to provide each one of the exposed class above mentioned with at least one dose, to be carried in his pockets; so that whenever the premonitions appear, he may take the preventive. A safe additional rule is for this class of persons to take a second dose at about the same hour the following day, and if it be known that the form of disease they usually have is tertian, another dose on the second day at same hour.

It will be observed that there are two distinct anti-paroxysmal uses of quinia and its salts; viz., one to prevent the recurrence of the paroxysm in an already developed intermittent, and for which specific instructions have been discussed.

The other, to prevent the development of the intermittent or miasmatic fever, by treating the premonitions of the initial paroxysms, for which definite directions have also been fully given. As those rules and instructions are the fruit of a protracted and extensive personal experience, I announce them with the utmost confidence, and urge their adoption. I feel that I know that they are adequate to prevent the paroxysms of miasmatic fever under both circumstances, for long periods of time; that they provide for all necessary amounts of the medicines, and avoid unnecessary and useless, not to say hurtful, consumption. It seems proper for me to remark in this connection, that I totally disagree with all of the much that has been written, upon the daily use of quinia and its salts as a so-called prophylactic against miasmatic fever *after* infection has occurred. I have carefully analyzed most of the published reports touching this point, and I am convinced that so far from there appearing any advantage in the plan, it is to me very clear that there is a decided objection to it on the score of both safety and economy, besides the fact that it is entirely unnecessary. I have already shown that we have no proof that a perpetual protection from miasm can be secured by quinia; and from that it reasonably follows that perpetual prevention of paroxysms need not be expected from a constant use of the medicine in quantities large enough to maintain its physiological signs. That being the case, what reason have we to expect that a dose twice daily too small (three grains for example) to produce any such signs, will prevent paroxysms. In my opinion we have none at all. It is easy to show that such daily dosing would consume double the medicine in the course of the year that will be required by the

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treatment of the premonitions only, as I advocate. This, of itself an insignificant item, perhaps, would be justifiable, were security from fever thereby effected. But, as we have just seen, that is theoretically impossible, and practically it is never realized. A very illustrative corroboration of the truth of this declaration may be found in the paper of Dr. Jones already quoted.

That gentleman institutes a calculation of the pecuniary value of the quinia used prophylactically in the quantity of three grains night and morning (in whiskey or brandy) to a regiment of about nine hundred men. He finds that the quinia thus given would cost at the rate of about $10,700 for the year. On the other hand, he states that the cost of the quinia actually required to treat the fevers of this same command for the year, no protection having been attempted, was only $1500. As an offset against this enormous difference of expense between the prophylactic treatment and the treatment of the disease when it occurs, amounting to about ten dollars per man more, he estimates the time saved thereby, at about $20,000, and thus obtains the result of about $10,000 saved by the prophylactic use of the medicine in three-grain doses, twice daily, for the year.[1] Were it true that this quantity, and this use of the quinia prevent fever, his conclusions would justify their adoption. But I do not believe that three-grain doses, given as he proposes, will prevent infection for many weeks, nor the occurrence of paroxysms after the infection has taken place. The treatment of fever would often become necessary among persons thus managed, and the consumption of the medicine would be consequently more or less largely increased, an additional expense which this author makes no allowance for. In support of my position, we have only to refer to the statements of one of the colleagues[2] of the

[1] It is surprising that Dr. Jones should have advanced this argument and allowed it to be published without alluding to its conspicuous errors. First, he does not furnish the least proof that three grains of quinia daily will prevent the occurrence of numerous cases of fever in the command he supposes; but on the contrary, he furnishes a very conclusive tabular statement of his colleague, Dr. Logan, showing that about 25 per cent. who took 4 grains daily for three months, suffered fever, and about one-third of this number had severe fever. Hence, added to all the quinia they took as a prophylactic, must be that which one-quarter of the number consumed during the fever which was not prevented. With this result for a period of only three months, we can safely say that it would have been much less favorable had the exposure been ascertained for a longer period. Second, he does not take into account the whiskey with which he proposes to mix this large amount of quinia.

[2] Dr. Logan, *op. cit.*

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above author, and, strangely enough, quoted by him; and we shall find that one out of every five of the persons to whom he gave the prophylactic dose of four, instead of three grains, morning and evening, had to be treated for fever, and a fever in a large percentage of the cases of a severe form. This I believe will be the experience of all who make the attempt to permanently prevent miasmatic poisoning and disease by the perpetual use of quinia, and especially if used in doses too small to produce any physiological signs. I therefore oppose it as an attempt to produce an impossibility, and as entirely unnecessary, the preventive treatment I advocate being an almost uniform success, and incomparably less expensive and troublesome.[1]

The following is a summary of that treatment. First, where it is desired to prevent the occurrence of the fever altogether, after infection has taken place; never give quinia before the appearance of the premonitions of the approaching paroxysm, except in cases known not to have premonitions of their attacks. To such it is well to give a dose on the seventh and eighth days. To these the dose should rarely be less than five grains of the sulphate, generally eight. To the former, the dose is usually five grains once in two to three hours till the symptoms disappear.

As a rule, it is well to give a five-grain dose on the following and second days, though where the persons are under constant observation, or possess sufficient intelligence to judge of the significance of their symptoms, these doses may be left untaken till premonitory signs shall declare a necessity for them. Persons, however, whose occupations expose them to storms, and sun and fatigue, away from the immediate supervision of the physician, should always take the precautionary dose on the two succeeding quotidian periods at the same hour. Where one or more paroxysms have taken place, and it is desired to prevent a recurrence, it is safer to give the medicine in divided doses of five to six grains each, one six hours, and the other three hours before the expected chill, and no more.

It can hardly be necessary to add that, where a prompt action of

[1] By the plan here advocated, a large average allowance per man would be 60 grains a month during the exposure, the total amount he would need to prevent the paroxysms, and cure any attacks of fever he might not have succeeded in preventing. Dr. Jones' plan would require 90 grains per month, and an indefinite amount to cure the attacks, besides the whiskey, a probable total of at least the value of 90 grains more. I regard the whiskey as worse than useless.

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the medicine is required, it should be given in solution. I wish here to record the fact, that in miasmatic intermittents of protracted and inveterate form, the addition of from the quarter to the third of a grain of morphia,[1] to the anti-periodic dose of quinia, will greatly augment the certainty of its desired action. Intermittents that resist the action of pure sulphate will at once yield to this combination.

THE CURATIVE USES OF QUINIA AND ITS SALTS IN MIASMATIC FEVER AND MIASMATIC DISEASE.

We now come to the third, and important therapeutic use of quinia and its salts, viz., its curative use during the paroxysms of miasmatic fever. To explain I will state that in those forms of miasmatic fever whose paroxysms are so prolonged as to be only partially thorough before a new one comes on, and known as remittent fever, and in that form known as congestive or malignant, wherein the unaided vital forces will too often succumb, the advantages of this curative action of the medicine are most conspicuous.

In the first form, or remittent, the vitality is often so depressed that after a few days the patient falls into a typhoid condition; which alcoholic stimulants and forced alimentation have little influence over. Such has been the character, I suspect, of many of those cases called Panama fever, though I have not met with them away from the Isthmus. But, in that country, I have often seen a typhoid condition supervene upon a miasmatic fever of prolonged paroxysms, which resisted all stimulant and nutritive treatment except quinia and its salts, or some few other articles which I will say more of in the future. Cases of this kind which rapidly sink under alcoholic and diffusible stimulants, yield, in a manner almost incredible, to the influence of a full dose or two of quinia. In like manner I have seen it relieve, as if by enchantment, the collapse of the malignant intermittent, and the burning heat and apoplectic symptoms of the violent ardent remittents and first miasmatic fevers. Regarding miasmatic disease as one of depressed vitality from that poison, it is clear to me that quinia and its salts must be admitted as stimulants with respect to this class of diseases,

[1] Dr. Bartholow speaks highly of the efficacy of narcotine under these circumstances. (*Op. cit.*, p. 110.)

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and must, therefore, theoretically, be useful at all stages of the disease.[1] Practically, I know that they are useful, and that their action is as certain and as apparently specific at all stages of miasmatic fever, as is iodide of potassium in syphilitic periostitis. Their province, however, seems to be mostly, if not entirely, confined to miasmatic fevers; for in typhus, typhoid, and yellow fevers, their behavior has not, so far as I have been informed, realized the hopes of the profession; and certainly has not supported the claims of their advocates. But that these agents are stimulants, with a specific influence against miasm, there can be little question, and so far as my experience enables me to judge, I may say that I have rarely seen them exert any useful influence upon any disease which did not possess some miasmatic complication.

To illustrate the curative use of this medicine, we will suppose a case of what I have termed the first miasmatic or climatorial fever whose symptoms will present themselves as follows. The patient will first experience wandering pains and sensations of discomfort, in various parts of the body, from the head to the feet

[1] From the views heretofore expressed as to the therapeutic *modus operandi* of quinia upon miasmatic disease, the reader will be prepared to hear that I totally disagree with Dr. Bartholow in the declaration that "it can neutralize, or destroy, very perfectly, the morbific matter." (*Op. cit.*, p. 101.) We must not accept the term "curing intermittents," as meaning the permanent removal of the poison producing the disease. We have already seen that there is no evidence that quinia in any amount ever does this, after infection occurs. (See p. 195.) It is quite gratuitous to suppose, as does Dr. Bartholow, that because the paroxysms "recur from time to time," it is on account of structural changes in the organs of the body, especially of the spleen and liver. This, in my opinion, is purely speculation, totally undemonstrable, and not in any sense a "fundamental fact," as he declares. (*Op. cit.*, p. 101.) There is to me an inexplicable confusion in the aggregate of his theories upon this point. Take, for example, the declaration above quoted, as to the neutralizing power of quinia, and that, in chronic malarial poisoning, large doses are improper, but that "small doses may be necessary, at suitable intervals, to neutralize any malarial poison still present in the blood." Where the "malarial poison" comes from, after having been so repeatedly exposed to the action of the so-called neutralizing agent, this author fails to inform us. Does he mean to convey the idea that, in the course of his treatment of the structural lesions of the organs in the disease he styles "Chronic Malarial Poisoning," stored-up poison is liberated from these organs, and again sent forth in the circulating fluid? He evidently does not mean that, for in the same paragraph he says, "If the organism have become accustomed to the quinia, and is no longer influenced by it, in respect to its specific action, we give in its stead—narcotine—a remedy in point of efficiency as an antiperiodic next, probably, to quinia." Why do we give narcotine, if quinia neutralizes the poison causing the disease?

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loss of appetite, and disturbed sleeps. After a variable time a chill more or less severe, supervenes, followed by a prolonged stage of fever, so long indeed that at the end of twenty-four hours from the beginning of the chill, he is still as hot as at the first appearance of the fever. It is not an infrequent occurrence in miasmatic countries, to see the fever continue day after day, with scarcely a moment's relaxation, a daily exacerbation being generally apparent.

Two terminations may be looked for in this continued form of miasmatic disease, viz., a final intermission, with subsequent quotidian or tertian paroxysms; and a typhoid or comatose and fatal condition. The latter is, so far as my experience enables me to judge, the more common, if no remedial measures are adopted. Now to interrupt the course of such a prolonged paroxysm; to moisten and cool the skin; to relieve the pains of the head and extremities, the great medicinal agents are quinia and its salts.

The plan which I adopted for their administration was based upon the supposition that any fever which lasted beyond twelve hours is very liable to take on the remittent or continued form, which theoretically results from too feeble protective constitutional powers to resist the depressing effect of the miasmatic poison. Hence when a fever continues longer than twelve hours, nature requires medical aid to prevent a quotidian exacerbation, and quinia and its salts are our main dependence. They should be given in full doses, repeated once in three hours, till the skin is moistened and the fever has subsided. A dose of from five to ten grains will often secure this condition, and convert the attack into an intermittent. This having been secured, the subsequent treatment is simply the periodic treatment. If the vitality is very much depressed, this dose may require repeating once or twice before the febrile action is relieved. I have never had any difficulty, however, in securing an intermission before the end of the second twelve hours, when the medication was commenced at the end of the first twelve hours, the time beyond which, we should never wait for the unaided powers of nature to secure an intermission. It is quite a mistaken idea that heat of skin and pain in the head contraindicate the use of this medicine in miasmatic fever. There is no sudorific at all comparable to it in the burning skin of this fever, and of all the arterial sedatives there is none equal to it. If the patient be reduced to the extreme of being typhoid, no stimulant will restore moisture to his tongue and skin, and tone to the intellect, and secretion, and powers of digestion, and assimilation, like full

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and regularly repeated doses of quinia. There is another form of fever, however, in which one's instincts would lead him to almost any other medication before quinia, but in which I have the utmost confidence in its controlling powers. I allude to that form known as the malignant or congestive form. There are two varieties of this: one, in which the patient, after suffering the premonitory discomforts already mentioned, suddenly falls insensible and almost lifeless, as if from an apoplectic stroke. The skin is cool, pupils dilated, pulse small and frequent, respiration slow and quiet, deglutition difficult or impossible, and there is often a relaxation of the sphincters. This condition I regard as one that may be properly termed miasmatic syncope, and certainly presents the most discouraging aspect. It seems almost folly to attempt any remedial measure to save the flickering vitality of such a case; but I have repeatedly seen such cases saved from impending dissolution, by the stimulant action of a few grains of the sulphate introduced in solution into the rectum, because administering it by the mouth was impracticable. The patient thus saved from destruction, is subsequently easily treated upon the anti-periodic plan. For such cases I never employed larger doses than ten grains, but as it is absorbed and appropriated with great rapidity, it may be repeated once in half or three-fourths of an hour, and should be so repeated till reaction is thoroughly established. These cases of miasmatic syncope are not unfrequently met with in soldiers stationed or campaigning in miasmatic regions. Most of the cases which came under my management during the early years of my residence in the tropics died; and died because I did not know what to do for them, as I now believe.

The second variety of this malignant form resembles apoplexy in its symptoms much more than it does syncope.

The skin is parched and burning, the action of the heart is violent and tumultuous, the carotids beat furiously, the pupils are insensible to light, there is profound coma, the respiration labored and stertorous, the face livid and more or less tumefied, and subsultus tendinum and even convulsions may be present. The physician instinctively thinks of the lancet before such an array of symptoms: but if he take the precaution to examine a little more carefully he will discover that with all the apparent vigor of the circulation, the pulse is in reality weak.

He will, upon further inquiry, also ascertain that the patient had complained of the symptoms premonitory of miasmatic disease for

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more or less time before the attack came on, and the chances are, that he will find that the attack was ushered in by a decided chill. Both of these varieties of miasmatic disease usually occur in persons who have resided in the locality for only a few weeks at most, and have been subject, besides, to much exposure to solar heat, to fatiguing duties and perhaps to other causes of prostration and disease. They are, indeed, cases of severe first miasmatic paroxysms of warm climates. The desperate character of the symptoms of this second variety, and the frightful mortality they have preceded, have doubtless led us slowly to the knowledge that the peculiar stimulant power of quinia and its salts, exert a controlling and saving influence over them. I have never seen anything in the use of these substances more satisfactory than the prompt manner they will quiet the circulation, hurry on perspiration, cool the skin, and restore sensibility and reason, in this second variety of cases.

It is one of the most charming manifestations of the stimulant action of quinia and its salts, as against the depressing effect of miasmatic poison.

A ten-grain dose of the sulphate administered as above stated, in this condition, is worth all the sudorifics of the materia medica, to bring on perspiration. Indeed any miasmatic fever, however, remittent or continued, is as amenable to the influence of these agents as are the premonitions of an attack. I do not doubt that large numbers of the deaths from the disease known in this country as the Chagres or Panama fever, have been the consequence of employing other agents than quinia or its salts, to effect an intermission of the febrile symptoms. On many occasions I have seen patients reduced to an extremely typhoid condition, by protracted remittent, and at length continued miasmatic fever, promptly restored by a few doses of the sulphate. I still retain a vivid recollection of a case which fell into my hands in the year 1854. Its history ran as follows: About three weeks before I saw it, the patient was attacked by a rather severe paroxysm of miasmatic fever. No medical attendance being available at the time, several repetitions of the attacks were suffered, and at the end of about a week, it had assumed the form of continued fever with daily exacerbations. As he was already greatly depressed, and with a continuous fever, the medical man who first saw him began the administration of alcoholic stimulants and sudorifics. He continued to sink, however, and at the end of about ten days of this management, I first saw him.

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He was thought to be moribund by the physician and attendants. He had taken no nourishment for about two days; he was in a state of profound asthenic coma; his pulse was hardly perceptible at the wrist, his skin dry and hot, except over the feet and hands, which were cool; the tongue and mouth dry and covered with sordes; the urine and feces had escaped involuntarily for some days; the former, however, was now nearly suppressed, and there was subsultus. It was with great difficulty that a little brandy and water was forced into the stomach, as deglutition was nearly impossible. Regarding this as a case of miasmatic typhoid fever, I at once began the use of a solution of the sulphate of quinia by the rectum in ten-grain doses once in four hours. Soon after the second dose, perspiration broke out, the mucous membrane of the mouth moistened, consciousness returned, and with it a desire for food and drink. At the end of twenty-four hours, every untoward symptom had disappeared and convalescence was thoroughly inaugurated. Such cases as this have fully convinced me that quinia and its salts are stimulants in the truest sense of the word, as respects the debility and depression caused by miasmatic poison, and that they are therefore indicated in all stages of miasmatic disease where the unaided powers of the economy are unable to terminate the paroxysm, and they should be administered without delay or previous preparation. But I desire here to record the convictions of my experience, that this stimulant or tonic effect of quinia is almost exclusively confined to miasmatic disease. I am not at all certain that I have ever witnessed any such effect from the medicine where there was not some manifest or suspected miasmatic element in the disease under treatment. After the foregoing pages were penned, the admirable little book of Professor Samuel Henry Dickson, of South Carolina, entitled *Studies in Pathology and Therapeutics*, found its way to my table.

I need offer no apology for quoting therefrom the following lines, in corroboration of the opinions which have been thus far expressed upon the subject under consideration, for the opinions of this distinguished physician and observer always possess a peculiar value. At page 189 he says: "I recognize one at least of our drugs, cinchona, with entire confidence, as a specific in the truly antidotal sense. Salisbury denies the quality of antidotal specificity, even to quinia, our most prominent and strongest example, while he admits its direct efficiency in controlling the morbid influence of the malarial poison. I am very reluctant to yield up

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the claim of this, our most admirable medicine, to be considered positively, strictly, and emphatically antidotal." He disagrees with Salisbury in attributing general tonic properties to it, and remarks: "If quinia be a direct tonic, which I seriously doubt, it is inferior in that property to others which are not imagined to be appropriate here. Its unequalled promptness of efficiency, its striking action of apparent arrest in the worst 'congestive' cases, deserve to be particularly dwelt on. Its virtues are equally displayed when administered hypodermically, as when received into the stomach. No other drug is employed thus, and in such small quantities, to relieve debility or prostration; nor is any other tonic, mineral or vegetable, gifted with its most beneficent prophylactic influence. There are as many who pronounce it sedative, as there are who regard it in the light of a stimulant tonic. 'Calmant' is the term applied to it by Drake. Experiments made to determine its properties are instructive chiefly in a negative sense. One, two, three, or five grains will suffice to arrest the course of an intermittent which would resist or evade the energies of all our most potent medicines. Yet, the same quantity, or four times as much, will stir up no disturbance in a healthy system; will not derange the pulse, nor the breathing, nor temperature, nor disorder the mind in any way." Latham, he says, enunciates a similar faith in its virtues by declaring that, "With it alone we *cure* fevers of a malarious type; we *treat* all other diseases."

"In such cases, without reference to surrounding conditions, abandoning of late even the once familiar ceremony of 'preparing the patient for the bark,' we administer our drug. We expect to resolve congestion, to subdue inflammation, to tranquillize irritation; and it does all this, and more." Whether regarded as a simple tonic, or a stimulant, or in reality an antidote, the quantity to be administered is subject to great variations, and such ones as point to the amount of poison to be counteracted or neutralized, or to the vital depression against which we have to contend. Insufficient quantity of the drug often, instead of controlling the disease, excites very disagreeable and even dangerous phenomena. I have a pleasant recollection of the case of a most intelligent and cultivated friend, who had been tortured almost to delirium, for some days in succession, by two-grain doses of the sulphate, once in two hours, and who was at once relieved of fever, headache, and incipient delirium, and thrown into free perspiration by a ten-grain dose of the medicine.

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From what I have before said of the liability to lose its therapeutic control, it may be understood why I believe quinia to be a *stimulant*, with specific action over the depressing influence of miasmatic poison. Were it strictly antidotal, I cannot see how it could ever fail to cure miasmatic disease, if given in sufficient quantity.

The summary, therefore, of the principles to be observed in the curative use of quinia and its salts, is as follows: Regarding them as stimulants, with specific action against the depressing influence of miasm, they are indicated in all cases of miasmatic disease where the unsupported powers of nature are apparently unable to terminate the paroxysm within twelve hours. That, under such circumstances, neither the heat of skin, nor pain of the head should be considered as opposing the propriety of their administration. That, indeed, no preparation, either by sudorifics, emetics, or cathartics, is necessary to their successful employment, but that, on the contrary, the delay attending such preparation is the loss of most precious time, which should be employed by the quinia. That, in the more violent forms of the miasmatic diseases, such as syncope, and the ardent apoplectic form, no time should be lost in applying their saving power to sustain the nearly vanquished forces of vitality.

In concluding this part of the essay, I desire to record the unqualified confidence I feel, that, by an observance of the rules laid down in the preceding pages, with reference to the use of quinia and its salts; and by the avoidance of the causes of diseases not miasmatic, most men, of even ordinary constitutional vigor, may reside in miasmatic localities for many years and enjoy more or less perfect health. The efficiency of the soldier, the laborer, and the mechanic may thereby be preserved, while large numbers of officers, officials and persons of less laborious and in-door occupations, may escape disease altogether. In addition, it may be proper to say, that distinctly periodic disease, whether of neuralgic or convulsive character, may as a rule be successfully treated with quinia, used according to the anti-periodic plan, but with the fact always before us, that quotidian return of pain, especially if attended with fever, is very liable to indicate inflammatory disease in the corresponding part, and therefore not amenable to the influence of the medicine.

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THE USE OF QUINIA AND ITS SALTS IN MIASMATIC AFFECTIONS NOT FEBRILE.

Under this head are comprehended the various forms of periodic neuralgia, which may affect any organ of the body. As the marked feature of these affections is pain, it is more frequently necessary to combine anodynes with the quinia in their treatment than in ordinary miasmatic disease. A regular periodicity in any diseased manifestation should at once excite suspicion of its miasmatic origin. Such cases, so far I as have seen, afford, as a rule, a history which clearly extends to miasmatic exposure, if not to former well declared miasmatic disease.

Dr. Bartholow inclines to the opinion, if I understand him, that a neuralgia produced by the ordinary causes, in a person "already under the influence of malarial cachexia," is liable to assume the periodic form, and will be very liable to deceive the practitioner. Its true character can only be discovered by the use of quinia. If it be miasmatic, it will arrest it, but if from traumatic or other causes, it will not influence it. This is problably true, though I have no experimental acquaintance with illustrative cases. Miasmatic neuralgia is treated upon the anti-periodic plan, and often not only demands the addition of opiates, but extra large doses of quinia. The various forms of these neuroses need not be mentioned, for they are not only numerous but easily recognized.

THE USES OF QUINIA AND ITS SALTS IN OTHER DISEASES THAN MIASMATIC.

After diseases of miasmatic origin, my experience has taught me that more benefit may be looked for from the use of quinia, in *erysipelas*[1] and its allied diseases, puerperal metritis and peritonitis, than in any other, perhaps I may say than in *all* others. During the years 1854, 1855, and 1856, I had many opportunities for bed-

[1] Dr. Bartholow seems not to have been acquainted with this important power of quinia, at least he does not allude to it. This power has apparently given rise to the idea, recently advanced by Dr. Neftel of New York, in a communication to the *Record* of April 15, 1869, that the causes of quotidian intermittents and of erysipelas are identical. This author has not, however, adduced sufficient evidence to convince us either of the "cryptogamic origin of intermittent fevers," or that, whether it be a fungus cause or not, it has any identity or even analogy to the cause of erysipelas.

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side observations of the influence of full doses (ten grains) of the sulphate, upon the phenomena characterizing severe forms of head and facial erysipelas. I found that it uniformly reduced the frequency of the pulse, and dispelled the delirium, of whatever grade. The depressed vitality received new vigor from it for a time, and the functions were again restored. The usual dose, however, was only five grains, except where the urgency of symptoms appeared to require larger ones.

I found that the improvement in the symptoms began to appear in about half an hour after the dose, and would continue a variable time, from six to twelve hours, when the symptoms would relapse into the same character they possessed before the dose was given, unless it were repeated. I took so many occasions to verify these observations, that I became as thoroughly convinced that quinia is as truly and as certainly a stimulant, applicable to the depression attending erysipelas, as it is to that attending miasmatic disease. At that time I felt much doubt as to whether the cases there experimented upon, were not thus influenced, by virtue of a miasmatic complication of the erysipelatous disease. Since leaving that country (the Isthmus of Panama), I have often had occasion to treat erysipelas, and have become satisfied that its symptoms are very beneficially controlled by the medicine, where no miasmatic element can be traced. By sustaining the vital forces, it indirectly retards, and finally arrests the advance of the local phenomena of the disease, while at the same time the cerebral and circulatory symptoms of the disease are more or less perfectly abolished.

But these results need not be looked for unless the medicine be given in full doses and repeated at regular intervals, that is to say, in doses of from five to ten grains, repeated once in each eight to twelve hours, as the symptoms may indicate. I regard it as a foolish mal-administration of the medicine, to give one and two-grain doses for this or any other disease. I know of no reason, physiological or clinical, for believing that a one or two-grain dose of quinia, twice or three times in the twenty-four hours, will interfere with the course of any disease in the adult. As well might we expect hunger to be appeased by a quarter of the food the appetite craves.

Admitting—till disproved—that quinia prevents the downward destructive metamorphosis of the albuminous tissues of the body, it is certainly rational to suppose that it can accomplish this only

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by opposing fixed proportionate amounts, precisely as nutrient material varies according to the circumstances of physical wear and tear. As food generally is most useful when taken in satisfactory quantities, rather than by piecemeals, so, in my experience, is quinia by far the most useful when given in doses which produce a sensible impression.[1] As to the use of the drug in the puerperal diseases above alluded to, I must rely upon the experience of others entirely, for I have had none personally. My distinguished friend, Professor Fordyce Barker, of Bellevue Hospital and Medical College, reports to me that he entertains the highest estimate of the value of quinia, first, as a prophylactic against puerperal peritonitis; second, in the advanced stages of the disease when the pulse begins to flag and the skin to moisten, indicating septæmic complication. As a prophylactic he prescribes it in five-grain doses, and as a curative or stimulant, from five to twenty grains, according to the urgency of the symptoms. He also relies upon it very much in mammary inflammation with imminent or existent suppuration. This last use of it is one of quite general application, viz., to all diseased conditions in which there is actual or impending copious formation of pus, attended by a manifest depression of the vitality, such as the suppuration stage of pneumonia, carbuncle, phlebitis, cold abscesses, pyæmia, and extensive suppurating wounds.[2] It is presumed that its utility in these cases depends upon its prevention of retrograde metamorphosis in general.

As a prophylactic against endemic influence, or the diffused septic cause of puerperal fever in the lying-in wards of a hospital, though Professor Barker believes in it, and practises it at Bellevue, I feel constrained to say that he furnished me no convincing reasons for the practice. As, therefore, its utility in such cases, is decidedly

[1] I do not wish to be understood as adopting the doctrines held by Dr. Bartholow, that "the maximum curative effect is obtained by the administration of the whole amount required in a single dose, rather than by a succession of small doses." I cannot see a possibility of practising upon such a theory, so long as the quantity required can never be known till experiment in the case in hand determines it. (*Op. cit.*, p. 103.)

[2] Dr. Bartholow speaks highly of its remedial virtues in the "stage of resolution of inflammation" of the lung without the formation of pus. Also in the resolving stage of orchitis, enlargement of the spleen, and congestion of the liver. (*Op. cit.*, p. 122.) In another part of his paper, however, he makes a distinction between enlargement of the spleen and fleshy spleen, the latter not being influenced by it. (*Op. cit.*, p. 109.) How we are to diagnosticate the one or the other condition he does not inform us, nor how we are to ascertain that the liver is "congested."

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doubtful, I would simply recommend that well-conducted experiments be instituted when practicable, to still further enlighten us upon this point.

In general practice, particularly in large cities, quinia may occasionally be employed, with unquestionable benefit, as an excitant of the appetite where no symptoms are present, save anorexia with more or less pallor and emaciation. This is most frequently observed among the children of the poorer classes; and has appeared to me as probably complicated with miasmatic causes. A medium dose of the sulphate, under these circumstances, given an hour before the morning and evening meal, will generally give appetite for, and power to digest food in ample quantity. But I regard the failure to effect this desire for food, as a positive contra-indication to the medicine, and that it should at once be discontinued.

This terminates the list of the non-miasmatic diseases in the treatment of which quinia and its salts have any well-established value.

THE ABUSE OF QUINIA AND ITS SALTS.

These are of two varieties, viz., those of *application*, and of *administration*. Of the former variety, that of the promiscuous, and almost universal prescribing of quinia as a *tonic*, ranks first.

One of the most illustrative examples of this abuse may be found in the record of about four hundred cases of disease treated in King's College Hospital, London, as published in *Beale's Archives of Medicine* for 1864. It will there be seen that about fifty per cent. of all of these cases took quinia in some of its forms, either during the course of the disease, or the convalescence. As that hospital is not one dedicated to the treatment of any particular class of diseases, but a general hospital, it becomes a matter worthy of our attention, as to what class of diseases required such a general use of quinia. I therefore subjoin a list of the diseases comprised in those four hundred cases.

Aneurism of the aorta.	Cancer of the stomach.
Asthma.	Chorea.
Aphonia.	Constipation.
Anæmia.	Debility.
Bronchitis, acute.	Dropsy, cardiac.
Bronchitis with rheumatism.	Dysphagia.
Catarrh.	Dyspepsia.
Cynanche tonsillaris.	Delirium tremens.

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Erysipelas.	Lumbago.
Emphysema and bronchitis.	Mental derangement.
Epilepsy.	Mania, puerperal.
Febricula.	Paraplegia.
Fever, typhoid.	Pericarditis.
Fever, typhus.	Phthisis.
Gout.	Pneumonia.
Headache.	Pleuro-pneumonia.
Heart, disease of.	Purpura.
Hemiplegia.	Rheumatism, subacute.
Hepatitis.	Rheumatism, gonorrhœal.
Hæmatemesis.	Sciatica.
Jaundice.	Scarlatina.
Laryngitis, acute.	Sore-throat.
Laryngeal ulceration.	Variola.

On account of what supposed property quinia should be applied to the treatment of aneurism of the aorta, to aphonia, to catarrh, to cancer of the stomach, to cardiac dropsy, to dysphagia, to constipation, to emphysema, to hæmatemesis, to purpura, to pericarditis, and to sore-throat, I am unable to say, and I may make the same remark with respect to nearly every disease named in this list. I can understand how it may be applicable to dyspepsia or slow digestion as a *symptom* of depressed vitality attending miasmatic disease, erysipelas, or exhausting suppuration. I can also imagine the possibility of epilepsy, sciatica, and even chorea depending upon some miasmatic cause which quinia might benefit or cure, but no such suspected complication is mentioned in these cases, and probably did not exist. Headache and lumbago might be added to this list of possibly appropriate cases for the use of quinia. The probability, however, is that the medicine was given in nearly all of these cases under the impression that it possesses general tonic properties, and is therefore indicated in all cases of enfeebled vital power. And this is the precise point that I combat. I have yet to see the first particle of evidence that this medicine possesses such tonic properties. I regard it as no better, as a general tonic, than most of the medicinal bitters, that indeed it is inferior to many of our vegetable and mineral tonics. Nor do I know of any evidence that it exerts any special influence over the skin, glands, or any organ of the body. I endorse to the full extent the opinions of Dr. J. Hughes Bennett expressed in the following language. "Quinia is spoken of as being a tonic when given in small doses.

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This property seems to have been attributed to it on account of its bitterness as well as its remarkable effects in the cure of ague. But whether it increases the appetite, stimulates the digestive organs, or in any other way operates by increasing the tone of the system and improving the nutritive powers, though generally adopted as true, admits of strong doubt. No doubt it is very frequently given to convalescents and weakly persons, who get better under its use, but whether this is owing to the quinia, or would not have occurred equally well without it, is a matter very difficult to determine. Of one thing I am satisfied, namely, that it is far inferior in tonic properties to many metallic, and other vegetable drugs, and, consequently, a medicine with such known anti-periodic properties, the supply of which is yearly diminishing should not be wasted in endeavoring to produce effects so very doubtful as the tonic virtues which have been ascribed to it. For many years, therefore, I have not given quinia as a tonic, and have yet to meet with a case where it is necessary to administer it in order to increase the strength of the system." (Vide *Clinical Lectures.*[1])

Returning to the list before us, we see typhoid and typhus fevers included; diseases whose abortive treatment by the use of quinia has been very considerably agitated within the last few years, particularly in the typhoid fever. But to day, so far as I have been able to examine the records, the leading practitioners and the best observers unite in regarding this practice, and even the practice of employing quinia at all in continued fever as a mal-application to use the mildest terms, of an invaluable medicine.

Dr. Bennett states that his efforts to cut short continued fever by the use of quinia, carefully and energetically administered, were uniform failures.[2] It is, therefore, an *abuse* of the medicine, and must be added to the very general abuse of it as a tonic. The same remark is applicable to its use in febricula. A counterpart to this list may be found by far too often in the records of hospitals in our own country, as well as in the private records of indi-

[1] Dr. Bartholow takes a similar view, and remarks that, as quinia neither improves primary assimilation, nor restores to the blood any principle in which it is deficient, results which follow the use of tonics, it cannot be regarded as a tonic. (*Op. cit.*, p. 127.)

[2] Dr. Bartholow says that a considerable personal experience and observation have satisfied him of the inutility of quinia in the treatment of typhus and typhoid fevers, but I am not prepared to adopt his view of the positive injury he thinks it inflicts upon the gastro-intestinal mucous membrane, when administered in these diseases. (*Op. cit.*, p. 120.)

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vidual practice; a perpetual evidence of the wide-spread abuse of quinia and its salts; shameful testimony of a routine and useless waste of our most valuable medicinal agents.

There is still another disease upon which the expenditure of quinia has been enormous, and which is not included in this list. I allude to yellow fever. My individual experience with quinia in yellow fever has not been very extensive, but so far as it went, had the effect of convincing me that it exercises no appreciable control over true yellow fever. My treatment of this disease was mostly in localities where nearly everybody suffers miasmatic fever; and in all the endemics of yellow fever which I saw, persons in precisely similar circumstances, often working side by side, and living in the same house, were attacked, some by fever which terminated in black vomit, at various periods of from twenty-four hours, to five or six days; while others had a fever—quite as severe apparently, while it lasted, but returned to their business on the third or fourth day after. As there was nothing in the symptoms to distinguish the one from the other, for from one to three days, they were all treated alike, that is, they were all treated upon the antiperiodic plan, with full doses of sulphate of quinia, given at the proper time, to prevent the quotidian and tertian return of the paroxysm.

The terrible black vomit paid no regard to the ringing of the ears from the quinia, while the true miasmatic cases were surely controlled, and the patients were early discharged. I entertain suspicion that the apparent success of quinia in yellow fever, so often recorded, has resulted from an experience similar to my own, and that most, if not all of the favorable cases reported as cured by the quinia or bark, were cases of miasmatic fever, and not yellow fever at all. The following remarks from Dr. La Roche's voluminous work on Yellow Fever tend to support me in this supposition. "It is far from being certain that, in cases in which the quinia is supposed to have produced the miraculous effects attributed to it, the apyrexia would not have taken place, and the cure obtained, had the remedy not been used. It is apparently successful only in the class of cases which, in the hands of other physicians who do not use the remedy, seldom prove fatal." After a very thorough examination of the recorded experience of a large number of physicians upon the subject of the use of quinia, in all the stages of yellow fever, Dr. La Roche concludes that, "in view of these circumstances, and independent of other considerations already

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referred to, he cannot but entertain some doubt as to the very great superiority of the quinia treatment, and especially the abortive plan. To this opinion he is the more inclined, seeing that several of its more zealous advocates would extend the practice to every other form of fever named in the books—typhus, typhoid, &c., in which, when resorted to by other physicians equally skilful, quinia as an abortive has failed to produce the anticipated effect."

This fact I have before alluded to, in speaking of the abuse of quinia in the treatment of continued fevers. Added to this authority, I have the oral authority of several physicians who have had much experience in the treatment of yellow fever, to the effect that they were of the opinion that quinia does not influence, one way or another, the course of true yellow fever. The only one who spoke in its favor, was one who has seen much of the fever in Havana, Cuba; but from a personal knowledge of his habits of observation, and the results of his treatment, I regard his evidence as unreliable. Besides the abuse of waste, there is respectable testimony to the effect that the so-called abortive use of quinia in yellow fever is liable to grave therapeutic abuse. Dr. La Roche quotes the following statements of a New Orleans physician upon this point. "Since the introduction of the appropriately named *abortive treatment*, by numerous doses of quinia, conjoined with powerful narcotics, the patients who recover from yellow fever frequently remain miserable valetudinarians, while blindness, deafness, and insanity too frequently follow in the dismal train. Under the modern abortive practice, our watering places in the neighborhood have been crowded with emaciated convalescents from yellow fever, many of whom have cause to lament, in ruined constitution, or impaired faculties or intellect, the pernicious consequences of the abortive practice." (Page 720, vol. 2d.)

The practice here alluded to was that of giving large doses of sulphate of quinia and opium at the onset of the disease. During the years from 1847 to 1853, this treatment met with much favor in New Orleans. For the endemic of 1853, however, it disappointed its advocates, and has not since recovered its reputation. The fact that it was thought necessary to combine it with opium, is to me proof that the quinia did not, from the beginning, control the disease satisfactorily, and that it is probably true that the opium would have done quite as well, if not better, without it. Whoever will trouble himself to read the literature of yellow fever, will learn that opium has a conspicuous place among the remedies that

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have been employed at various periods in the treatment of this disease, and he will not be surprised at the expression of the probable influence of the opium used in combination with quinia by the New Orleans physicians, which I have just made.

So far, therefore, as my experience goes, so far as the observations of many of my medical acquaintances have reached me, and so far as the most reliable recorded results can be taken in evidence, the use of quinia in yellow fever is, to say the least of it, an abuse.

ABUSE OF ADMINISTRATION.

Added to the abuse of application, is the, perhaps, more general one of administration. I have heretofore alluded to this subject in speaking of the doses, and the periods between their administration, and I, therefore, need simply state, that whether given for miasmatic disease; to prevent miasmatic poisoning;[1] to stimulate in the depression of erysipelas or in suppurative exhaustion, doses too small to produce any manifest impression, I regard as an abuse of the medicine, as well as dangerous to the patient under treatment. The minimum dose for the adult in any of these diseases and conditions, is four grains. I regard five to eight grains as the medium and usual dose, and ten to fifteen as the maximum. As I have before explained my reasons for this belief, I will not here repeat them. The intervals between these doses should be from two to twelve hours, according to the object sought to be attained, as has heretofore been fully explained.

I therefore regard the administration of one to two grains, to the adult, at intervals of four to eight hours, as generally a useless waste of the medicine. This dose, given hourly, will sometimes accomplish good results, but it is a very troublesome plan, and rarely offers any advantage over that of giving full doses at much longer intervals. It is a method which will secure decidedly less effect from the medicine given than that of the larger doses at longer intervals, and is on that account, therefore, an abuse.

Another abuse of this valuable agent is in the selection of the form it is to be administered in. For example, pills of the sulphate of quinia manufactured by means of a gum arabic mucilage, and thoroughly dried, are practically insoluble, that is to say, a full dose of the salts in this form, would take so much and such an

[1] See page 193.

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uncertain time to dissolve in the stomach, that whether taken as an antiperiodic, a preventive, or as a stimulant, there can be no reliance placed upon its acting as desired. Quinia, nor any of its salts, should, therefore, ever be given in the form of pill *except it be freshly made and with a very soluble menstruum.*

We now come to the consideration of the last, and, as I regard it, the greatest abuse of all the abuses in the administration of quinia, viz., the introduction of the substance into the areolar tissue of various portions of the body, and into the veins. This is an innovation of therapeutics of very modern origin. It followed very slowly upon this manner of using the neutral salts of morphia and other substances; and has been very cautiously adopted by physicians of intelligence and ingenuity. The reasons for this caution are obvious, and are alluded to by all the advocates of this system of use of quinia, viz., its insolubility except in decidedly acid fluids. Nor have I yet seen any satisfactory argument or experience that, in my estimation, outweighs this objection to this manner of employment of the quinia.

I regard the objections as, first, that it is a painful operation, both in the introduction of the instrument, and following the permeation of the tissues by the fluid injected. So considerable is this latter pain that morphia has been suggested and employed in combination with the injected quinia to relieve it.[1] Second, it is followed by inflammation in the parts permeated, an inflammation that not unfrequently results in suppuration at the locality. Third, the possible danger of injecting a vein with not only the acid fluid but with bubbles of air; and lastly, that it is very rarely indeed a proceeding at all necessary. While engaged in writing some papers in 1861, I referred to the subject of the subcutaneous use of quinia as a possible, but rarely required manner of administering the medicine, and the subsequent reports upon the subject only confirm those theoretical fears.

It is claimed by some that the acid added to the fluid is rather a source of safety than of danger, the real danger arising from the presence of undissolved particles of the salt or of dust or other extraneous matter that may by accident be found in the solution. This is an admission of danger attending this manner of employing the medicine which, in my opinion, renders it impracticable as a system.

[1] Dr. Bartholow, one of the advocates of this administration, suggests the local anæsthetic use of ether spray to overcome this objection. (*Op. cit.*, p. 105.)

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It is a statement, that under the most favorable circumstances, a solution of quinia may be so carefully prepared as to render it safe to introduce it into the subcutaneous areolar tissue. What must be the danger in camp and field hospitals! In this connection I may present, as a most instructive matter, the result of the experiments instituted by the Committee of the Royal Medical and Chirurgical Society[1] during the past year. That Committee "found that neutral solutions as a rule were tolerated, but that very acid and very alkaline solutions were apt to cause irritation." They also "found that a drug injected subcutaneously was far less rapidly absorbed and less intense in its effects than when introduced into a vein." As an index of the degree of irritation produced by the injection of solution of quinia into the subcutaneous areolar tissue, I regard the following statement of the Committee as worthy of attention, as meaning an irritative fever thus excited. They found that "when the drug was injected into the cellular tissue, considerable elevation of the temperature was observed, this symptom being slight or inappreciable when the drug was taken in the same quantity by the mouth, or by the rectum."[2]

While the committee conclude that this manner of using various soluble substances is often advantageous as securing greater intensity and rapidity of action, and include among this number quinia, they add that "some caution is requisite in giving large doses of this drug, as irritation may arise from its presence under the skin." The Committee then conclude: "That, as a general rule, only clear neutral solutions of drugs should be injected; for such solutions rarely produce local irritation; and that such solutions introduced subcutaneously are more rapidly absorbed, and more intense in their effects, than when introduced by the rectum or the mouth." And they finally conclude that "this plan is most likely to be adopted where very rapid and decided effects are required from

[1] Medico-Chirurgical Transactions, vol. xxxii. p. 561, 1867.

[2] Dr. Bartholow's remarks upon this matter do not meet the support of the results of the Scientific Committee. He says, "It is a remarkable fact that the cure of malarious disease by subcutaneous injection may be accomplished without any disturbance of the vascular system, without any alteration of the normal thermal line, and without any disorder of the cerebral functions." (*Op. cit.*, p. 105.)

The Committee found that a much smaller dose (3 grs.) than Dr. Bartholow's minimum (5 grs.) for the cure of ague, produced increase of temperature, accelerated the pulse, and gave rise to headache, whether given in a physiological condition or in disease. (*Medico-Chirurgical Transactions*, 1867, pp. 575 and 640.)

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drugs which are operative in small doses."[1] It is to be regretted that the Committee do not state more fully what they mean by small doses, but judging from the tenor of the report, I think it a fair inference that quinia is not a substance which comes within the scope of their recommendation. During the discussion which followed the presentation of this report, Mr. Moore, who is quoted by some of the advocates of this use of quinia, as authority, remarked that large doses of medicines introduced in this manner, "always gave rise to suppuration; that even fifteen minims in one case produced this." He thought that "three, five, or six minims was the best quantity." These statements I regard as explanatory of the meaning of the term *large* as used by the Committee, and as showing that it does not mean therapeutical quantity, but simply physical quantity.

It would seem, however, that the physicians at the New York Hospital have had better results than Mr. Moore. According to their report, as published in the *New York Medical Journal* for December, 1867, they are in the practice of giving thirty-five to seventy minim injections of quinia with comparatively rare occurrence of suppuration at the point of introduction, and this though their usual dose thus given contains more than one-fifth of a minim of strong sulphuric acid, and is consequently a strongly acid fluid. They had, however, been obliged to treat six abscesses, at the date of that report, resulting from the local inflammation produced by the injection, and remark that when this kind of "trouble was about to ensue, the *swelling normally consequent upon the injection* increased after the second day, and redness together with beating pain, were noted. Besides abscesses, they, with all the nice care to filter and prepare the solution, not unfrequently see what they term phlegmonoid swelling result at the seat of the injection.

Among the French physicians, the most recent contributor to this subject is Jules Arnould, who after referring to an extensive experience of a successful character in Algeria, remarks that the disadvantage of this method is the action of the substance upon the subcutaneous cellular tissue. He thinks, however, that a very careful preparation of the solution might reduce this liability to disagreeable effect, to an insignificant minimum. The New York Hospital report, however, affords us some more definite idea of the

[1] *Op. cit.*, p. 589.

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significance of these results. Arnould's prescription is quinia sulph. in twelve parts of water, and the addition of a *few* drops of sulphuric acid, one which, I need not remark, is no guide to its exact proportions.[1] It was clearly an acid, and a decidedly acid fluid. He remarks, that the nearer neutral it is, the less danger there is from its use. While he thinks that it will require only about two-thirds as much to produce the same effect, as when given by the mouth,[2] he does not think that this use of it should supersede its administration by the mouth, wherever it can be done without inconvenience to the patient. This, to me, seems evidence enough that the danger attending the subcutaneous use of quinia is so great, that we must show weighty counterbalancing advantages to justify it, or some insuperable difficulty in the way of its administration by mouth or rectum.

The advantages claimed are, promptness of action and greater efficiency and permanency of effect. As to the first of these—promptness—I have only to say that the occurrence of circumstances in which this alleged advantage can be of any appreciable value over the use of the medicine by the rectum, will be exceedingly rare, if indeed ever.

As to its efficiency, we have seen that Arnould thinks that about two-thirds the amount of the medicine is required when administered in this way, that is required by the mouth.[3] I regret that he has not favored science with some observations upon its use by

[1] Dr. Bartholow proposes "the solution of the alkaloid, quinia, in ether" as one, in his experience, least objectionable, and less likely to produce accidents. He makes it of the strength of one part of quinia to sixty of ether. "One grain of the alkaloid to six minims of ether is the most condensed solution" he has found advisable. (*Op. cit.*, pp. 105 and 106.) He also gives the following formula for an injection of the sulphate of quinia, 60 grains; dilute sulph. acid, 40 minims; distilled water, one fluidounce. A fluidrachm of this he regards an ordinary dose for an intermittent, but he is careful to say that it should not be injected in one place, but in several different parts at the same time, taking care not to select parts likely to be called into use, "for more or less pain and soreness follow the application." He had been so unfortunate as to produce large abscesses by injections, but after further study of the subject, and the most exact and delicate care in the preparation, as well as in all of the steps of the administration of the solution, he finally attained such results as led him to accept and recommend it as an established practice. He thinks the whole quantity necessary when thus administered to cure an intermittent, would be 8 to 12 grains of the sulphate instead of 20 grains by the mouth.

[2] This corresponds to Dr. Bartholow's view.

[3] The same as Dr. Bartholow.

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the rectum, for I have little doubt that they would have confirmed my own, which satisfied me that quinia in perfect solution by the rectum, is much more prompt and efficient than by the mouth.[1]

As to its claimed permanency of action, I cannot but suspect that there has been some error in the observations which led to such a conclusion. The very fact that the medicine is promptly absorbed, is sufficient reason for believing that it is equally promptly eliminated, and consequently that its effect must of necessity be less permanent. There is, therefore, no physiological reason for the statement that quinia is more permanent in its action when injected under the skin, than when taken in any other way.[2] As to the point of the greater economy of the medicine when thus employed, I think that but little can really be shown. Arnould, as we have seen, thinks that about one-third can be saved by this method of administration.

Mr. Moore, in his early contributions thought five-sixths might be saved. But the physicians at the New York Hospital discovered that, in the class of cases which came under their charge, "this was far too high an estimate." They state that in that hospital "four grains of the medicine were needed to break an attack

[1] The Scientific Committee of the Medico-Chirurgical Society found that absorption of quinia from the subcutaneous areolar tissue as well as from other parts was liable to great variations as to rapidity. In one experiment 3 grains were absorbed from the areolar tissue in 35 minutes; in another, it took place in 4 minutes; and in another 5 grains were taken up in 8 minutes.

At the same time it was found that in one experiment, 3 grains of quinia were taken up by the rectum in 35 minutes, in another it took place in 45 minutes; and in a third, 5 grains were taken up in 10 minutes. Very much of the value of this report is lost on account of the neglect of the committee to record the amount of fluid with which these quantities of the medicine were combined. They add the following instructive observations: "No local injury followed the injection of five grains of quinia in this instance;"—the only one they produce in support of the practice—"but in another, where a larger quantity of water was used—the quantity in this case not being given—an abscess formed, perhaps from the fluid having been too rapidly injected." With this untoward experience in the only two cases the Committee adduce in support of its use in miasmatic disease, before them, they issue the following curious conclusion: "Not only then are rapidity of action and completeness of result advantages belonging to this method of exhibiting quinia, but also economy of material—a considerable recommendation to medical men of foreign stations, and to travellers in countries where intermittents prevail and the remedy is scarce." (*Op. cit.*, p. 575.)

[2] So far as recorded experience enables us to judge, the evidence that quinia, introduced into the subcutaneous tissue exercises a more permanent effect than when taken by mouth or rectum, is furnished by the pulse and temperature of the body. And I submit that this is fully accounted for by the irritation and inflammation that the operation causes.

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of tertian fever, and that fully eight were required for a quotidian." This, however, does not mean that the treatment of the case was accomplished by only four or eight grains, as is clearly shown by the history of three cases which immediately follow the statement. The first case, for example, consumed sixteen grains, besides an indefinite amount of other medicine.

The second case had forty-four grains during the treatment, in addition to other medicines; and the third case forty-two grains. The reporter adds that the management of these three cases gives a correct idea of the general management of the "common intermittent" at that hospital by the subcutaneous treatment. This makes an average of about thirty-five grains used in the treatment of common intermittents.[1]

Now, if we look at the old treatment of this disease at this same hospital, which the reporter gives in the same paper, it will be seen that for simple tertian they usually gave fifteen grains, that on the seventh day they gave five grains, making twenty, and six grains daily for the six intervening days, making thirty-six more, a total of fifty-six grains, if kept under treatment a week, against forty-four grains by the new method. For quotidian fever, five additional grains were usually employed, making a total of sixty-one grains for the treatment of a common quotidian. Taking this as a statement of absolutely necessary amounts, it appears to me a very trifling economy, when placed by the side of the admitted danger attending the subcutaneous use of the medicine. But it is only necessary to refer to the preceding pages of this essay, to understand, first, that in the treatment of the common intermittents, an entirely unnecessary amount of quinia was employed in the old style of treatment at the New York Hospital; and, second, that thirty grains of the sulphate of quinia is a full quantity for the treatment of a common tertian or quotidian intermittent—that it can generally be done with fifteen or twenty. I have treated thousands of cases of quotidian intermittents with ten and fifteen grains of the sulphate. Four grains, the same as employed subcutaneously at the hospital, was a very common dose as an antiperiodic, given by the mouth, and I am convinced that if given by the rectum would be as effective as under the skin. Stillé credits Trousseau with the statement that the dose of quinia in solution by the rectum is rather smaller than by the mouth; and Kuhn, with the

[1] From three to four times as much as Dr. Bartholow puts it.

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doctrine that the dose by the rectum, if much diluted, is about half that required by the stomach.[1] As to the treatment of the remittent form of the fever as practised at the New York Hospital, by two grain doses of the sulphate every two hours, I regard it as about as bad treatment as I have ever heard of. I will refer to the paragraph in this essay relating to mal-administration of insufficient quantity, and improper times, for further details upon this point. The reporter acknowledges that the treatment of the remittent form by subcutaneous injections has been unsatisfactory at the hospital; indeed it would seem to have been almost impracticable on account of the perpetual annoyance of the syringe.

The effect of all this evidence has been to convince me, that while there is a very decided economy in the proposed subcutaneous use of quinia and its salts, over the *usual extravagant* manner of employing it by the mouth in miasmatic fevers, there is but very little economy if it be given by the mouth in *necessary amounts only*, and that the saving is still less if the administration be compared between the rectum and subcutaneous cellular tissue.

And when I place this small saving of the medicine against the danger and the inconvenience of its subcutaneous use, I do not hesitate to declare it as my opinion that the promiscuous employment of quinia in this manner is a dangerous abuse of administration.

[1] Dr. Bartholow's experience in this matter has led him to conclusions so extraordinary that it seems necessary to comment upon them. He says: "We have ascertained, by careful clinical observations and experiments, that four times the quantity is required by the rectum that is necessary by the stomach, to produce a given physiological and therapeutical effect." The Medical and Chirurgical Scientific Committee state that the difference between the effect of quinine by the mouth and by the skin is "more marked than between the skin and rectum." (*Op. cit.*, p. 574.) Yet according to Dr. Bartholow's idea the effect by the skin is seven times greater than by the rectum. It will therefore be seen that all competent authority fails to sustain Dr. Bartholow in his statements relating to the comparative value of quinine administered by mouth, rectum, and skin. We have a clew, however, to his reason for this opinion, in the remark that by "suppository, or by clyster" he has found the rectum the best channel through which to introduce quinia in certain cases. (*Op. cit.*, p. 121.) I am surprised that the fact should have escaped the attention of a man of Dr. Bartholow's intelligence and habits of observation, that the *rectum is not a digestive organ;* and that therefore substances introduced into it which require digestion and solution, are very slowly and very partially appropriated. Such substances are quinine suppositories and quinine clysters, made either with water pure, or some emulsive fluid. On the other hand, when perfect solutions are introduced, the function of the rectum as an absorbing organ is secured, and the fluid is rapidly taken up.

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The occasions in which the sulphate in pill or other form is objectionable by the mouth, and inadmissible in solution by the rectum, I have never yet met with, and I presume will very rarely be seen. I therefore believe that in all cases where a prompt action of the medicine is desired, and there is any potent objection to its administration by the mouth, it should be given by the rectum in perfect solution, of a strength of not greater than ten grains to the ounce. The rectum tolerates this with little or no inconvenience, and its absorption is very rapid. The use of the subcutaneous cellular tissue then, or a vein for the introduction of quinia into the system is not only dangerous, but while the mouth and the rectum are available, and one or the other nearly always is, it is entirely unnecessary and therefore improper, in other words, it is, as a rule, an abuse of administration.

It appears hardly necessary that anything need be added upon the abuse of quantity administered in any manner. I have very rarely had occasion to give more than twelve grains, and even this amount I regard as a large dose. The results said to follow such doses as twenty, forty, and sixty grains, have been alluded to in speaking of the use of the medicine in the "abortive treatment" of yellow fever.

Temporary blindness and convulsions are also said to follow these excessive quantities.

Bence Jones advances the theory that, as quinia arrests the changes going on in the albuminous tissues, large amounts are liable to surcharge the body with toxic principles, by transferring the eliminative functions to the introduced quinia, from the quinia-like substance normally there. Hence, the violent nervous disturbances. So far as my experience can add to these records, it may be stated that larger doses than ten grains, repeated once in two to three hours, are, as a rule, an abuse of administration of the medicine. In concluding this essay, it appears proper to remark upon the fact that all of its statements have reference to the single salt mentioned, viz., the sulphate of quinia. I have used other preparations from the bark, such as cinchonia and quinoidine, whose physical and chemical peculiarities need not be mentioned here. It is sufficient for the purpose of this paper that I state that the cinchonia is less soluble with acid than the sulphate of quinia, and is therapeutically about half the strength of that salt; and that the quinoidine is but about one-third of the therapeutical value of the sulphate of quinia, and that they are both less reliable. The

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only other salt of quinia with which I have any experimental acquaintance is the *valerianate;* and I can only say that I have not become convinced that this salt possesses any advantages in any case over the sulphate. On account of its disagreeable odor, there is indeed a decided objection to it. While it is more soluble in water than the sulphate, it is not sufficiently so to offer any marked advantage in this respect. Except so far as relates to odor, the same may be said of the *muriate of quinia.* The *arsenite of quinia* is obviously an almost inert preparation, so far as the quinia entering into its composition goes. This is equally true of the phosphate and the ferrocyanate. And I may here add that none of the other salts of quinia possess any properties, chemical or therapeutical, which enables them to rank as standard or available remedial agents. In regard to the tannate of quinia, it possesses but one desirable quality, viz., it is nearly tasteless, a peculiarity which arises from its nearly complete insolubility. How it should ever have found its place among the medicinal salts of quinia, to be prescribed in the same doses as the sulphate, I am unable to account.[1]

Wood, in the 1867 edition of the *United States Dispensatory* says: "The tannate may be prepared by precipitating the infusion of bark, or solution of sulphate of quinia, by the infusion of galls or solution of tannic acid, and then washing and drying the precipitate." Again, in speaking of the incompatibles of the sulphate of quinia, he says: "It is also precipitated by astringent infusions, the tannic acid of which forms a white insoluble compound with quinia."

It is, therefore, clear that tannate of quinia should not be included in the list of the therapeutic preparations of this salt, though it so appears in very recent standard works upon materia medica. Tannate of morphia is a similar product of incompatibility, and is generally recognized to be so. I therefore regard the observations that resulted in placing the tannate of quinia as high as the sulphate, in therapeutic value, as exceedingly superficial.

Before closing, it appears to me as important to the subject of this paper, that I state that, next to quinia and its salts, I have experimental reason for regarding the salts of bebeerin as of the greatest therapeutic value in miasmatic disease. I have not em-

[1] Dr. Bartholow remarks of this salt that, though "less objectionable in respect to taste, its difficult solubility in the gastric juice renders its utility exceedingly questionable." (*Op. cit.*, p. 129.)

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ployed it in any other disease. It has precisely the same physiological effect as quinia, expressed by the ringing of the ears, and other nervous symptoms. I have often employed it instead of quinia, and with so good results, that in the absence of this medicine, I should feel safe, if well provided with the sulphate of bebeerin. Dr. Bartholow's experience with bebeerin does not appear to have been so favorable as my own. He ranks narcotine among the vegetable salts, as next to quinia in miasmatic disease. I have no experience to contribute upon this subject. His views relating to the value of arsenic in these diseases are supported by abundant authority.

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REPORT

OF THE

COMMITTEE ON THE RELATIONS OF ALCOHOL TO MEDICINE.

BY

JOHN BELL, M. D.,
CHAIRMAN.

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REPORT OF THE COMMITTEE ON THE RELATIONS OF ALCOHOL TO MEDICINE.[1]

THESE relations are various, and for the most part unfriendly and deceptive. Medicine, as a science and an art, with its attendant hygiene, incessantly desires and aims to bring about a removal of the disorders of both body and mind; and, at the same time, to promote the greatest health and consequent ability in all to discharge every duty, personal, social, and political, and to enjoy the present life under an animating sense of the bounties of creation, while looking to a brighter future with devout hope and aspiration. With all its imperfections in teaching and practice, to medicine has been accorded the merit of increasing the average duration of life, and the means of making life desirable and pleasant for the masses, by improved public and private hygiene, and a clear explanation of the natural laws to which man must conform for the preservation of his health and the avoidance of disease. How shall we designate the relations of alcohol—a poison, a constant source of disease, of strife, and of turmoil, of personal misery, and social disorders—to medicine, as now presented in its expressive and readily recognized lineaments? There are, however, advocates of alcohol, with some poetry and songs on their side, who, remembering only the short gleam of sunshine during a few minutes of elevated feelings and social hilarity, claim for alcohol benign relations to medicine, as giving it aid and support, and holding out promises of renewing a health and strength which it never originally imparted, exciting joyous feelings, gladdening the hearts of the wan and weary, quickening the intellect, and, in fine, beautifying and elevating humanity. But the real and unbroken record, beginning with the drunkenness of the patriarch Noah, and taking note of

[1] The other members of the committee are Drs. Dunbar and McSherry, of Baltimore, whose assistance the chairman was not so fortunate as to procure on this occasion.—J. B.

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that of the just Lot, and coming down to the last instance of falling from grace of a Christian minister, tells of the faithlessness of alcoholic support. In a like unbroken series, from Alexander in a fit of drunken passion killing his dearest friend Clytus, on to the murder in our own day of his children by a father, crazed with alcoholic drink, we learn how the nearest and dearest ties of kindred and friendship are ruthlessly broken under the dominion of this wide-spread poison. Youth, health, and beauty have been made hideous; genius and high moral worth perverted and degraded by the same malign influence. The State, at a moment of its greatest need, has been deprived of its best men—its rulers, counsellors, and defenders, who had become the slaves and worshippers of alcohol. Its productive industry is curtailed by the sickness, infirmities, dissolute courses, and premature deaths to which so many of the laboring and manufacturing classes have been reduced by drinking alcohol in the form of fermented and distilled liquors. But the evil does not stop here: the State, through its citizens, is taxed for the relief and support of the poor, a large number of whom have become destitute and helpless by the habitual use of alcoholic drinks; and the State is farther taxed in the cost of bringing to trial and punishing criminals, and the erection of prisons and penitentaries for their safe keeping and confinement. A majority of these criminals have been made so by their previous addiction to alcohol in some form or another. To alcoholic account must, also, be placed, in large proportion, the necessity of constructing and maintaining State hospitals for the insane, as well as the numerous institutions of a similar character sustained by individual benevolence. Farther proofs of the extent and depth of the evils of alcoholic indulgences are painfully exhibited in the increasing calls for asylums for inebriates of both sexes, who come from all grades of society, and who can furnish from among themselves examples of every degree of previous intelligence and refinement. One of the first presents and soon one of the first articles of barter offered by civilization to barbarism is alcohol, in the form of ardent spirits—"fire-water," as the poor degraded Indians appropriately call it, for it has been to their tribes and race an inward fire, increasing their thirst for blood and impelling them to the wildest acts of cruelty and torture of their unfortunate captives.

The relations of alcohol to medicine should be studied under a fourfold point of view, as presented under the several heads of HYGIENE, ETIOLOGY, THERAPEUTICS, and MEDICAL JURISPRUDENCE.

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At the very beginning of our inquiries it may be asked, if alcohol is a poison, why should it be spoken of in connection with hygiene? It is not a food; it forms no part of the protein compounds out of which the tissues are organized, nor of fat and oils which serve other purposes in the living body. As far as regards anhydrous or absolute alcohol, spirit of wine, there can be no doubt of its being a violent poison, nor of its destructive effects in this way, even when diluted with water, as in distilled spirits, if taken in a large quantity at once. A single draught of spirits—brandy, rum, or whiskey—in quantity varying from three ounces to a quart, has been followed by speedy death, sometimes at the very instant, and at other times after an interval of a few hours. The shock of a large dose of alcohol on the nervous system acts like a blow on the head, or a kick in the stomach. Prussic acid is not more deadly. In the second degree of acute alcoholism, coma and lethargy supervene, and death takes place after a period varying from twelve to eighteen hours. But need we ask for more conclusive evidence of the toxic operation of alcohol on the human frame than that daily furnished by the last stage of drunkenness, in the bewilderment of the mind and senses, loss of muscular power, and final insensibility and stupefaction, resembling apoplexy itself? We shall have something more to say on this point under the head of etiology. If it is alleged that alcohol, like other poisons, may, when diluted, be used with benefit in many cases, the reply is that in no case is any other poison, however serviceable, when used medicinally for a limited period, had recourse to as daily food, to nourish the system. Not only is no acknowledged poison ever employed with this intention, but no medicine, even the mildest vegetable bitter, can be continued for a length of time without damage to health in some form or another—more usually by deranging the digestive and nervous systems, for the relief of which it was first taken. It can be shown both by physiology and by the still stronger evidence of large and long experience in all ages and countries, that alcohol, although its habitual use may be tolerated for a length of time, is always detrimental to a person in ordinary health, and still more if he be a sufferer from chronic disease and debility.

Is Alcohol a Calorifacient?—A plea for the habitual use of alcohol has been set forth on the ground of the chemico-physiological hypothesis of Liebig, which would make this liquid, not a food, but as giving indirect aid, by furnishing elements for respiration and the evolution of animal heat. Alcohol, according to this view,

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is a carbo-hydrate on the same line with starch, sugar, fat, and oils. It is known to be rapidly absorbed and to enter into the circulation, whence it in part escapes with the excretions, and in part is burnt in the lungs; its carbon uniting with the oxygen of the inhaled air to form carbonic acid and its hydrogen similarly combined to form water. During the process of oxidation, heat is supposed to be given out. This hypothesis rests on the postulate that a part, and it must be the larger part, of the alcohol taken into the stomach is not, after its absorption, subsequently discharged through the various eliminating organs, but that it remains in the blood for the purposes of combustion. To what extent this postulate is available we have no means of judging, nor have we any demonstration of the soundness of the hypothesis itself. If there is to be a continued evolution of caloric, maintained by continued oxidation in the manner just stated, there must be a constant supply of alcohol, which would be followed by dangerous consequences to the brain and other organs, all of which, it will be shown, suffer from such supply. But granting that all the conditions are complied with, the promised results are not obtained. The greater the quantity of alcohol ingested and absorbed the greater ought to be the quantity of its carbon furnished for combustion and the larger the amount of carbonic acid excreted. Now, so far from this being the result, it has been ascertained by Prout, Vierdort, Perin, Boecker, and others, that there is less carbonic acid both relatively and actually given out from the lungs after even a moderate use of spirituous drink. Dr. Edward Smith shows, as the result of his carefully conducted experiments (*Transactions Royal Society*, 1859), that alcohol and substances containing much alcohol *disturb* the respiration rather than influence it in any direction. The respiratory process, therefore, instead of being quickened into greater activity, and made more productive of animal heat, is retarded; and there is, at the same time, a confinement and accumulation in the venous blood of waste or used-up materials seeking for oxidation and elimination, to relieve the system of what would be oppressive and disturbing if not poisonous. If animal heat were generated so rapidly and largely by the fuel furnished in alcohol we ought to look to its free use for enabling the living body to resist cold, whereas the very opposite is the true result, as will be shown in a subsequent part of this Report. It may be stated, in advance, that the temperature is always lowered by the free use of alcohol in the form of ardent spirits. Drs. Boecker and Hammond

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found this to be the case in their own persons even from moderate doses of spirits.

Is Alcohol an Accessory Food?—Another plea in favor of alcohol is, that it acts indirectly as food, not by contributing anything itself to build up or to repair the tissues, but by its diminishing the metamorphosis to which they are constantly subjected, and the consequent waste, it removes the immediate call and necessity for the renewal of food, prevents the cravings of hunger, and lessens the debility from fasting. This plea, the second, for the use of alcoholics, it must be seen, is quite incompatible with the first plea, that their use favors the generation of animal heat. The conditions for the latter are, increased respiratory force, increased oxidation of carbon and hydrogen, not only of these elements as furnished by alcohol, but also by the fat and broken tissues in the blood, and correspondingly increased metamorphosis from the degradation of the detached textural remains. On the contrary, the diminution of waste or wear of the tissues implies, of necessity, diminished transformation or metamorphosis, less oxygen, the prime agent in all these changes, and its diminished combination with carbon, and of course less completeness of respiration and less evolution of animal heat. A choice must be made of the two hypotheses; and if the last be the one taken, we must admit that it gives color to the plea in favor of the indirect action of alcohol as a nutriment; but if it be received, we must utterly repudiate the claim set up for alcohol being a supporter of animal heat. Many difficulties, however, stand in the way of our subscribing to a belief in alcohol being even an indirect food. It gives no strength and repairs no waste; and if it seems to act as food, it is by preventing certain changes in the constitution of the blood which are essential to health, and by substituting its own combustion in the lungs for that of the disintegrated and waste substances in the venous blood. There is less appetite under these circumstances and less consumption of ordinary food, but on what conditions is this saving brought about? The reply must be, a loss of the balance between supply and waste, a temporary derangement of the functions of digestion and innervation, a living on material that has been thrown off from the tissues as worn and unserviceable and the retention and accumulation of which increase the proportion and deteriorate the quality of the venous blood, causing remora, plethora, congestion of the great organs, and especially of those in which the veins abound, viz., the brain, liver, and

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lungs. We would ask, in the words of Professor Miller, of Edinburgh: "Whether shall we take alcohol, eat less, and be imperfectly nourished; or take no alcohol, eat more, and be nourished well? Whether shall we thrive better on a small quantity of new nutritive material, with a great deal of what is old and mouldy; or on a constant and fresh supply of new material, in sufficient abundance to dispense with the old, which, being then in all respects useless, is extruded from the system?"[1] The diminished metamorphosis of tissue under the use of alcohol is evident not only in the lessened elimination of carbon, as carbonic acid, but also in that of nitrogen, as urea. This indicates that less mechanical force is produced in the body and less work is got from the human machine. Large quantities of alcohol, therefore, tend to cause an accumulation in the system of imperfectly oxidized bodies, such as uric and oxalic acids. The action of the lungs and kidneys is lessened—less carbonic acid, less urea, and less water are eliminated. It is very evident from all that has been said, and the assertion cannot be too often repeated, that alcohol has no claim whatever to be regarded as food in reference to nutrition or the repairing of tissue, nor can we admit its claim to be considered as an ordinary agent for maintaining temperature by intra-combustion as tenable. Whether it is entitled even to a place among condiments will be better ascertained after we shall have inquired into its alleged value as an aid to digestion.

The firm hold which, for some years past, the animal chemistry of Liebig has taken of the minds of so many persons, both in and out of the profession, who found in it a show of science to support their alcoholic creed, must serve as an apology for arguing afresh against a theory the weakness and fallacies of which have of late been exposed by the experiments of Dr. Edward Smith, already cited, and of Fricke and Wislicenus. Dr. Anstie, who insists on alcohol being a food, which disappears in the body and is decomposed there, but in a manner yet unknown, is, however, obliged to admit that our search for the oxides of alcohol must be entirely recommenced. We should go a step further and say with Lehmann, "that we are still entirely deficient in the very first principles necessary for a scientific treatment of the theory of the metamorphosis of matter in the animal organism." As remarked by the same writer, "we should be unable to give a *scientific explanation* of the mechanico-chemical processes in the living organism

[1] Alcohol: Its Place and Power, pp. 71-2. Philadelphia: Lindsay & Blakiston.

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until we had acquainted ourselves with the yet unknown law of molecular forces." The very foundation of the metamorphic speculations in which alcohol is made to take so large a share, is not stable. They rest on the presumed fact of its being only partially eliminated from the organism and of the greater portion of all that is ingested being turned to account in generating animal heat and in forming fat. Numerous experimenters, Percy, Bouchardat, Sandras, Lallemand, Perrin, Duroy, and Hammond, show that alcohol is present in the blood and tissues of both man and animals after its ingestion in the stomach. Dr. H. never failed in experiments performed by himself on dogs to which he had administered strong alcohol to recognize the presence of this substance in the blood, the brain, the stomach, the expired air and the urine of these animals; but when using liquid, containing from eight to fifteen per cent. of alcohol, such as the German, French, and Spanish wines, he was never able to find it in the solids, though detecting it in the products of respiration by a solution of the bichromate of potassa in sulphuric acid.[1] In the experiments of Dr. Percy, an injection of about two ounces and a half of strong alcohol into the stomach of a dog was followed by the almost immediate death of the animal; and in submitting the brain immediately after to distillation, a notable quantity of the alcohol was procured.

Alcohol, says Bence Jones,[2] produces on each substance, in each texture, its chemical action, still continually undergoing oxidation, so that, in a few hours, one part has entirely escaped, and another part has been entirely oxidized in the blood and textures. Strong or weak, it combines with oxygen; more or less increased oxidation, increased circulation, increased secretion, increased effusion of liquor sanguinis and altered nutrition result. But one great and pervading error in all these chemical explanations of functional action is, in overlooking the part performed by the nerves, on and through which the larger number of vital phenomena following the use of alcohol, are produced. Not only is this fact evinced in the disturbed and deranged functions of animal life—the brain and senses, and the ready servitors of the former, the muscles—but also those of organic life, digestion, respiration, and nutrition, etc., all the movements and changes in which are modified by the varying degree of innervation to which they are constantly subjected.

[1] A Treatise on Hygiene, p. 553.

[2] Lectures on some of the Applications of Chemistry and Mechanics to Pathology and Therapeutics, p. 204.

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If we would have a measure of the power and dangerous effects of alcohol on the human organism, it will be found in the disorders of the nervous and muscular system, far more than in the altered relations of the chemical elements to one another.

Alcohol as a Stomachic, Condiment, or Food.—Of all the sanitary feats for which alcohol has obtained credit, the greatest stress has been laid on its alleged cordial and invigorating action on the stomach. Its advocates assure us that it will give appetite, promote digestion, relieve if not cure dyspepsia and its concomitant blues, and vapors, and horrors, stand in the place of food, when this is not obtainable, and obviate the oppression which follows excessive repletion. Who shall explain the contradiction of its being imagined to be capable, according to the wants of the case, of filling a vacuum, or reducing a plenum, of being equally good for the starveling who cannot get wherewithal to eat, and for the glutton who eats too much? The unsoundness of this creed can be demonstrated by general observation and experience, to which chemistry and physiology lend their aid. Water, heat, and acid are mainly instrumental in the first process of reducing the ingredients of the food taken into the stomach to a semi-fluid homogeneous mass, the chief component parts of which are albumen and casein; and the process of this first or stomachic digestion is completed by the addition and incorporation of pepsin, the active organic solvent in the gastric juice. Alcohol has no share in this stomachic digestion; but, on the contrary, it interferes with and retards the reduction of food, and in place of dissolving, it coagulates and hardens the protein compounds, and after first increasing, diminishes and obstructs the secretions of the solvents from the mucous glands of the stomach. Schwann, Blondlot, and Müller have shown that alcohol destroys the digestive property of pepsin, and Todd and Bowman in their Physiology are equally decided in the same belief as expressed in the following language: "The use of alcoholic stimulants also retards digestion, by coagulating the pepsin and thereby interfering with its action. Were it not that wine and spirits are rapidly absorbed, the introduction of them into the stomach in any quantity would be a complete bar to the solution of the food, as the pepsin would be precipitated from the solution as quickly as it was secreted by the stomach." The common use of alcohol by anatomists and naturalists to preserve animal organs and tissues unchanged, ought to be sufficient proof that this liquid must be opposed to the reduction of animal matter, either

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into a homogeneous pulp, such as is required for its conversion into chyme, or into a homogeneous fluid, as we see in chyle. What can be said now of the popular fallacy of a glass of wine after soup or after fish at a dinner party, or a glass of spirits and water, if not two or three glasses, especially if dyspepsia be complained of? At one time the advice almost universally given by physicians to dyspeptics was, for them to make their dinners of beefsteak and brandy or whiskey and water. Every now and then, some of those who followed this dietetic course would tell of the relief obtained; but no list has been preserved of the many who were made hopelessly intemperate by this systematic drinking of alcohol, in progressively increasing quantity; for the invalid would find it necessary to increase, from time to time, the amount of his liquor, in order to procure the same agreeable feelings that ensued after the first prescription. Similar evils have, we know, resulted from the frequent use of alcoholic tinctures of various bitters; and on this account a very natural prejudice is beginning to be felt against this class of remedies. It is alleged, with good reason, that in the alkaloids of the various bitter, tonic, and narcotic vegetable substances, as well as in the form of powder, extracts, and aqueous solution, we can procure all their active properties without recourse to an alcoholic menstruum. Doctor Benjamin Rush, in his admirable tract[1] on the subject, after speaking of the danger of valetudinarians who labor under disorders of the stomach and bowels, flying to spirits for relief, says: "So apprehensive am I of the dangers of contracting a love for spirituous liquors by accustoming the stomach to their stimulus, that I think the fewer medicines we exhibit in spirituous vehicles the better." The immediate effects of alcohol as experienced in exhilaration of mind, and removal of painful feelings from oppression of the stomach may impose for a time on the dyspeptic, but he will not be long in discovering that no abiding benefit, in improved power of digestion, can be expected from its use. It may be, that the muscular coat of the stomach, obedient to the excitement of the sensitive mucous membrane, contracts with more force and propels into the duodenum the offending or difficultly managed food. But if this food has not been fully converted into good chyme by solution in the gastric juice, and is hurried onward into the intestines, it becomes an irritant to this portion of the alimentary canal, and continues to be so in its whole course,

[1] Enquiries into the Effects of Spirituous Liquors upon the Human Body, and their Influence upon the Happiness of Society.

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and fails at the same time to furnish its due proportion of properly elaborated fluid for chyle and blood. If we are in quest of a safe auxiliary to pepsin, one that prepares the food for complete reduction by the latter, it will be found in dilute acetic acid, but never in alcohol. If we want a safe and active condiment, one always at hand and of universal use by all mammals, we find it in common salt, or the chloride of sodium, which plays so important a part, from the first solution of food in the stomach on to its assimilation into blood, and the formation and metamorphosis of tissues. Unlike the alien alcohol, which, when taken into the stomach, is rapidly absorbed and hurried along with the circulation, to be eliminated in great part as speedily as possible, or when retained produces very equivocal if not mischievous results, this salt of soda is everywhere at home in the organism. It is one of the saline constituents of the blood, the chyle and the bile, and has a share in the processes of nutrition and secretion, especially in that from the kidneys. A comparative trial of the dietetic value of the two substances might be made in the following way. Let one human being take a drachm of common salt daily, through life, as a condiment with his food, and another for the same period an ounce of alcohol diluted with water in the shape of distilled spirits, and note the result. It is not difficult to foretell on whose side the advantage would lie.

The question of the claim of alcohol to be regarded as in any sense a food, naturally comes up again when digestion is the theme before us. Interfering seriously with this process, we could not but regard alcohol as adverse to nutrition, and so its habitual use is found to be. While the main proposition is beyond dispute, there are, it is alleged, exceptional circumstances in which this liquid keeps up the powers of life, not by augmenting the receipts, but by diminishing the expense—it supports but does not nourish. Dr. Hammond, distinguished for his physiological and psychological researches and his contributions to hygiene, has made experiments on himself to show that alcohol should be regarded as an accessory food, which he puts on the same line, in this respect, as pepper, cayenne, mustard, and vinegar, and tea and coffee. The experiments of Dr. Hammond[1] "had reference to the influence of alcohol—1, when the food was just sufficient for the wants of the organism; 2, when it was not sufficient; and 3, when it was more than sufficient. Four drachms of alcohol were taken at each meal

[1] Physiological Memoirs—A Treatise on Hygiene.

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diluted with an equal quantity of water." Each of the three series of experiments was continued for a period of five days, and in each period 60 drachms of alcohol were taken. After the first series, when the food was of such a character in quality and quantity as to maintain the weight of the body at its normal standard, Dr. H. found that he had gained .45, or a little less than half a pound. In the same period the amount of carbonic acid and aqueous vapor exhaled from the lungs had undergone diminution, as had likewise the quantity of urine and its solid constituents. During these experiments his general health was somewhat disturbed. His pulse was increased to an average of ninety per minute, and was fuller and stronger than usual, and there was an indisposition to exertion of any kind. There were also headache and increased heat of the skin. The second series of experiments was made when the body was losing weight to the extent of .28 of a pound daily. Under the use of the alcohol this decrease was arrested, and there was again a small indeed but appreciable increase equal to .03 of a pound, or rather more than half an ounce daily. The quantity of food previously too scant, now fully satisfied the appetite, and all the functions of the body were performed with regularity, while during the five days of diet that preceded the use of alcohol there was unusual exhaustion after exertion. "In the third series of experiments, in which more food was ingested than was necessary, the ill effects of the alcohol were well marked. Headache was constantly present, the sleep was disturbed, the pulse was increased in frequency and force, and there was a general feeling of *malaise*." Dr. Hammond adds: "I am sure that had the experiments been continued, I should have been made seriously ill." But "notwithstanding all these abnormal phenomena, the body continued to increase in weight above the ratio which existed before the alcohol was ingested, and the excretions were diminished in quantity."

Alcohol Injurious in Health.—While giving full credit to the experimenter for the zeal which prompted and the intelligence which guided him in making these trials, we cannot but regard them as too limited in duration and as wanting in number and variety of persons to allow of our receiving them as conclusive in settling a mooted point. As far as they go, they prove most strongly the injurious effects of alcohol when drank by persons in health, either when they take their customary allowance of food, or when they go beyond it. These two classes of persons will probably

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give us the larger number of all those who use alcoholics in some form or another; they are kept in a state of unnatural excitement and continual predisposition to disease, and are never in the full possession of their mental and muscular power. Were the young, when they begin to use alcoholic drinks, to analyze their feelings and sanitary condition, they would acknowledge that they experienced some at least of the discomforts and functional disturbances described by Dr. Hammond, as resulting from his first and third series of experiments. Left to their own instinctive appetites and feelings, most of these young persons would at once desist from the further use of drinks which make them dull and feverish, but for the evil example and the still more pernicious advice, under a show of philosophy, of those with whom they associate. After a while they get habituated to the poison; but after a somewhat longer while, the poison takes possession of them; they are its slaves, and a certain number—how fearful the proportion—are put on the roll of regular topers and confirmed drunkards, broken down in health, in mind, and character, and often victims to *delirium tremens* and confirmed insanity. Drunkenness is not, as many seem to think, an extemporized thing; but, on the contrary, it is reached by slow progress—a gradual metamorphosis of the outer man and of his character corresponding with a metamorphosis of tissues taking place in the interior of his body. The beginning of the disease and vice, for continued drunkenness, prolonged alcoholism is a compound of both, is in the season of youth, of health, of confidingness, when evil is least anticipated, and measures of prevention are not even discussed. And yet this is the very time for prevention, and for putting young persons on their guard against the danger before them. The means of protection for their whole lifetime are simple, easy of fulfilment, involve no mortification of the flesh, or ascetic observances of any kind; they check no generous emotion, no lofty aspirations; they interpose no impediments to the development of the greatest intellectual and bodily vigor, nor abate in the least, business activity and acuteness. These means are simply abstinence from alcoholic or intoxicating drinks, the immediate effects of the use of which are shown in derangement of health and uneasy restless feelings, and the secondary and remote but still certain effects in diseases of various kinds, and more especially of those in which the brain and nervous system at large are most affected. This is not a question of mere physiological curiosity or of speculative hygiene, the solution of which is to

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show to what extent an appetite for a poison, diluted and disguised as it may be, but still a poison, can be indulged in without immediate ill consequences, and whether the alleged enjoyment of the many is to be prevented for the safety of the few. The real question is one of much wider and deeper significance; it is eminently practical, and calls for the decided opinion and action of every member of a community, of every liver in the land. There are persons with a happy temperament and under favoring circumstances, such as advanced age, who have no fears of their falling into habits of intemperance, but how few there are who can look round on their family circle, or, if safe there, on the circle of their relatives and friends, without being pained and mortified at seeing one of the number a drunkard, or who is suffering from a shattered constitution and incurable disease owing to the habitual use of alcoholic liquors, a burden to himself and a sore grievance to others. What profession or calling, what religious or philosophic teaching, can give security against such a degradation of the individual who persistently exposes himself to danger. Would then all the members of a family, or of a family connection, have deemed it any hardship determinately to abstain from the use of all intoxicating drinks, if by so doing they might have induced the youth—a son, a brother—whom they loved and cherished, to abstain also, and thus prevent the long train of heart-rending scenes resulting from his intemperance. Would they not gladly, rejoicingly abstain from such drinks, if in the midst of his career of drunkenness they could get him to imitate their example? If it be the part of wisdom to look beyond the hour, and to furnish guidance for the future from experience acquired in the past, her lessons ought certainly to prevail under the circumstances we are now describing. Medical men, more than all others, have the knowledge and the opportunities for giving effect to these lessons; they, more than the rest of mankind are cognizant of the evils, both physical and moral, that follow the habitual use of alcohol; and, as guardians of health, they are imperatively bound to exert themselves to the utmost not only in mitigating but in preventing these evils. If medicine be allowed to dwell in a self-complacent if not exultant spirit on the improved public health, and prolonged average duration of life of the masses in all civilized countries, it is because of a more and more diffused application of hygiene in pointing out the means for the prevention and against the recurrence of diseases both sporadic or occasional and epidemic. Medicine, true to her mission, cannot—must not—

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hold back from preventing the diseases, not to speak of the concurrent moral blight and destruction ensuing on the continued use of intoxicating drinks.

Continuing our comments on Dr. Hammond's experiments, it would seem that the mere diminution of the excretions and a slight increase of weight, following the use of alcohol, do not of themselves evince health, for they coexisted in the first and third series of experiments, with considerable functional disturbances, viz., headache, disturbed sleep, increased frequency and force of pulse, increased heat of the skin, and indisposition to exertion of any kind, and—though not mentioned—we must believe, loss of appetite, all of which would have ended in serious illness, had the experiments been continued. Great eaters might profit by a knowledge of these experiments, and learn that the free use of alcoholic drinks, so far from diminishing the effects of repletion, and helping them to digest their food, only increases their oppression, causes feverish thirst, which they often try to assuage by more drinks of the same kind, and a general disorder of the body, culminating in serious disease. If they are told that this is the result of intemperance, they would probably be quite surprised, and perhaps somewhat nettled at the imputation, which they would repel by asserting that they were never drunk in their lives. What a marvellous diminution there would be in the number of diseases and deaths, and of individual and social distresses and miseries, if drunkards were the only sufferers from the use of alcohol. Dr. Chambers, who is not opposed to its occasional use, declares most emphatically, that the action of frequent small divided drams is to produce the greatest amount of harm of which the alcohol is capable, combined with the least amount of good. A few pages before he had said, as the result of observations of cases coming under his notice, "On the whole, we may conclude that the effect of continued small doses of alcohol is to diminish vital metamorphosis, to make it irregular, and to induce in healthy people the necessity for crises of evacuation. Its first action is upon the stomach, enabling more food to be digested, and increasing vitality; but if advantage is not taken of this first action, its secondary effect is a diminution of vital functions in general, and of digestion among the number."[1] Small encouragement to the dyspeptic for his having recourse to alcoholic drinks. Present relief and increased digestion, to be followed in an indefinitely short period by vomiting or purging, or cholera,

[1] Lectures, chiefly Clinical, p. 568.

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and aggravation of his disease. The same writer tells us that he has "never known a forenoon tippler, even though he never got drunk in his life, without a condition of stomach which most infallibly shortened his days." In the selection of lives for insurance, Dr. Chambers thinks it much more to the purpose to ask the proposer the pointed question: "Do you take spirits in the forenoon? Is that a habit?" than to make the usual aimless inquiry whether the proposer is "sober and temperate." Nobody is anything else, of course, on these occasions, and the answer is a mere declaration of opinion. Doctor Christison states that three-fourths of all the cases of Bright's disease which he saw were produced by the habitual, long-continued abuse of drink. Very great occasional excess did not act so strongly as long-continued smaller excesses.

The second series of experiments of Dr. Hammond are exceptional, and cannot be allowed to represent what would be the sanitary condition of laborers, workmen, and all those who take active exercise, if placed under the alcoholic regimen. These persons might bear up under it for a few days, as they would, for the same time, aided by the excitement of hope or promise of reward, but no longer. Their systems would require better blood material than retained excreta from broken-down tissues, to make up for a deficiency of real food to sustain them under the additional exhausting metamorphosis from muscular contraction, and the waste from largely increased cutaneous and pulmonary exhalation and secretion, which would find no adequate offset in the diminished waste caused by alcohol. In treating of the origin of muscular force in animals, Lyon Playfair draws the conclusion that the normal food and fuel of muscles consist of albuminous bodies, which must constantly be supplied to produce sustained effort, and prevent corporeal deterioration. Dr. Chambers, who talks of alcohol as accessory food, is obliged to admit that we are unable to trace any direct increase of force to alcohol, even in the smaller doses, and for the minutest period of time.

WINES.—More favor has been asked for *wine* than distilled spirits in treating of the effects of alcoholic liquors on the animal economy, and not a few writers on dietetics are disposed to make a compromise by giving up the products of the still to merited reprobation, and yet holding on to the fermented juice of the grape. In the present stage of our inquiry, we need only observe that, although wines differ in strength and consequent activity of ac-

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tion, yet they are all of them alcoholics, and as such, when ingested, produce the effect already described, of interrupting stomachic digestion by precipitating and coagulating pepsin. Their primary action on the brain and heart, by stimulating these organs, is analogous to that of distilled spirits; their secondary and remote effects are different, but whether to their hygienic credit, is a question that may admit of great doubt. It will suffice to say, with Pereira, who is no ascetic or enemy to vinous drinks, that "it cannot be denied that the most perfect health is compatible with total abstinence from wine; and that the habitual employment of it, especially by the indolent and sedentary, is calculated, in many instances, to prove injurious. To a person in perfect health, and who has been unaccustomed to it, no possible benefit can accrue from using it. The preternatural excitement which in these cases it would occasion, must be followed by a corresponding degree of depression. Even though no sensible injury may result therefrom, no benefit can be expected to result." And in another place this writer says: "To persons in health the dietetical employment of wine is either useless or pernicious." All that we have said, in the way of advice and warning to the young and the healthy respecting the danger they incur in the use of alcoholic drinks in general, is applicable to their use of wine. If, as a matter of taste, or of gentility, or may be from conscientious scruples, a young man rejects brandy, or whiskey, or rum, let him not believe, for a moment, that he incurs no danger to his health at the time, and is not beginning a habit which may enslave him, when he takes a glass of Madeira, sherry, or port. He compounds with temptation by drinking twenty-three or twenty-five per cent. of alcohol, in place of forty-eight or fifty per cent., a glass of heavier-bodied wine being equal in strength, if not in intoxicating property, to half a glass of brandy. He will, however, probably prefer champagne, the favorite beverage of the day among intoxicating liquors; and then he takes but twelve per cent. of alcohol. If he drinks four glasses of this wine he will be alcoholized to the same extent he would be by a glass of brandy or whiskey, with the additional chances of having more headache and disinclination for breakfast next morning after the champagne than after the brandy, or its equivalents, whiskey or rum. We are told of the alcohol in wine being modified, not only in taste, but also in its inebriating operation, by the different substances—sugar, gum, extractive matter, salts of potassa, and in the red wines, tannin, and in the champagne, carbonic acid

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—with which it is mixed. The practical fact, however, is that other things being equal, as regards sanitary habits and social position, the spirits drinker will be apt to outlive the wine-bibber, supposing that each of the two carries his intemperance to the point of getting frequently drunk. Pitt, and Fox, and Sheridan, names so distinguished in the political and parliamentary history of England, all shortened their days by their free drinking of wine, although the stigma of drunkenness was fixed on the last alone, who towards the close of his life became a brandy toper. Let not, then, the ingenuous youth of our country lose their buoyant feelings, gayety, and susceptibility to true enjoyment in the muddling effects of wine, or of alcoholic drinks in any form. Would, that advice on this topic were required only for young men; but the other sex is also in imminent danger. It is, unhappily, no fancy sketch to see young girls just beginning to mix in general society, who are too ready to quaff champagne with their male partners in the dance, or at the supper-table, unconscious of the consequences in their changed features and expression, flippant speech, and loss of that air of retiring modesty which constitutes so much of their charm. They are not aware, at the time, that they are beginning to lay up a store of nervousness, fitfulness, and feelings of languor and lassitude which may soon furnish an excuse, and, perhaps, in the opinion of a thoughtless physician, a cause for recourse to stronger wines in the day. More ready still is the now almost inevitable stereotype prescription of milk-punch—that is to say, the best food and strengthener and blood material, half prepared to become chyle, mixed with a liquid that is no food, destroys pepsin, and otherwise spoils digestion, and poisons the blood, if it is not soon expelled from it by the eliminating organs. Others of the female sex, not tempted by wines, find at their social meetings sweet cordials —liquors of which they are persuaded to drink, and thus lay the foundation for habits of intemperance which crop out when they become wives and mothers—sadly to the distress and embarrassment of their physicians, who may now with some feelings of compunction ask themselves how far their own previous prescriptions or their entire indifference to the subject of intoxicating drinks had contributed to produce this melancholy state of things.

Intemperance from Wine.—Many well-intentioned persons, who deplore the evils of intemperance caused by distilled spirits, think that a remedy would be found in the substitution of fermented liquors, and, in this belief, advocate the cultivation of the vine on

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a large scale, so that the people everywhere may be able to procure wine for common use. Foreign countries are cited to show the temperance of the inhabitants where wine is largely made and consumed; and of these France is spoken of with the most emphasis. A careful inquiry into the subject has not by any means justified such a favorable view. Your reporter, who spent a year in Paris, had an opportunity, while attending in the hospitals of that city, to learn something of the habits of the lower and poorer classes of the population, who do not come under the notice of travellers. Statistical returns show that the people, not only of Paris, but of other great towns of France, furnish a large quota of victims to alcohol, and the evils of intemperance are deplored by not a few of the medical men and publicists of that country. The subject subsequently engaged his attention, and he would refer to a small volume[1] of his for documentary and other proofs that wine countries, taking France as their representative, have little cause for self-congratulation and boast on the score of exemption from drunkenness. As said in the work referred to, "What is the experience of those persons who mix with the people in their fêtes; who look into their *cabarets*, or small wine and brandy shops; who watch the crowds returning into Paris of a Sunday evening from outside the barriers, where they get wine cheaper than in the city; who visit their hospitals, to note the causes of disease and of surgical injuries, and to make a record of their insane, and the causes of this disease; who read the newspapers, and learn in them the origin of quarrels and duels between soldiers at a cabaret, and of disobedience of men to their officers?" Villermé, high authority on all statistical and benevolent questions, said, years ago, that drunkenness is the greatest curse of the laboring classes in France. Wine, especially the common country wine, does not stimulate them enough; it only serves to give them an appetite for something stronger, which they find in their own brandy. The successive stages of intemperance are so well described by Villermé, that one might suppose he had drawn the picture from what transpires so commonly in our own country, and in the United Kingdom of Great Britain and Ireland. The workmen or operatives drink spirituous liquors, he tells us, at first, without pleasure, and merely through imitation; soon to indifference succeeds an agreeable sensation; then an insensible desire is felt, and a passion continually augmenting. "It is thus gradually, and by a rapid descent, a man passes from habits of

[1] On Regimen and Longevity.

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sobriety to habits of intemperance; from the moderate use of intoxicating drinks to their abuse. Henceforth everything becomes an occasion for visiting the tavern (*cabaret*): he goes there when times are prosperous, because he gets high wages and has money; when he is for a while without work, because he has nothing to do; when he is happy, in order to enjoy himself; when he has domestic troubles, in order to forget them. In fine, it is at the tavern that he contracts his debts, and pays them when he can; that he makes his bargains; that he contracts his friendships, etc., and that even he gives his daughter in marriage."

After describing the waste, idleness, turbulence, debasement, diseases, shortening of life, vices and crimes which drunkenness brings in its train, Villermé adds: "We may affirm that drunkenness is truly the chief cause of the quarrels, a great number of crimes, and nearly all the disorders and irregularities which the operatives commit, or in which they take a part."[1] Chevalier, in his treatise on "The Prevention of Diseases among Printers," states as the chief means for meeting this end, dissuasion from the excessive use of intoxicating drinks, and from frequenting petty taverns and pot houses. After these statements of their own writers, the French people will not, probably, feel themselves scandalized by the following extract from the work of Sir Henry Bulwer,[2] who, by the way, generally describes France in as favorable a light as possible. He is speaking of the workmen and operatives of Paris. "Hatters, drunkards; tailors, vicious and dissatisfied; nappers and cotton spinners, so wretched that no fault should be found with them; cabinet-makers, fond of drinking, but of quiet tempers; printers and analogous trades, drunkards; house painters, drunkards, very careless; marble cutters, drinkers and hot-headed; workmen in harbors, exceedingly addicted to drinking; curriers, drunkards in the highest degree." The operatives of both sexes in Lille, St. Quentin, etc., exhibit an amount of disease and demoralization from alcoholic drinking equal to that in the large manufacturing towns of Great Britain, but, happily, without a parallel in those of the United States. We have mentioned insanity as one of the diseases in France which ranks intoxicating drinks among its causes. Of 256 persons received in the hospital for the insane at Charenton, near Paris, who were deranged from physical causes in

[1] Annales d'Hygiène, t. xxii.

[2] Monarchy of the Middle Classes, 1834–36. Vol. i. p. 219. Intemperance and its attendant evils have been on the increase in France since Sir Henry wrote.

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three years, 64, or one-fourth of the whole, had become so in consequence of excess in the drinking of wine (*abus du vin*); of these twelve were females. At Caen, the proportion of patients from drunkenness in the insane asylum was one in every eight and one-half. The returns of the cause are strong drinks (*liqueurs fortes*).

M. Fleury, in his course of lectures on Hygiene in the Paris School of Medicine, speaks in very decided but not flattering terms of alcoholic drinks. They exert, he assures us, "an action of very brief duration, and if the working classes would substitute for the abuse of these drinks the use of good food, and especially of meat, they would gain in strength and health, and would be protected from all the diseases which follow in the train of drunkenness. Alcoholic drinks are anything but tonics and corroborants with the use of which hygiene cannot dispense; they are at most stimulating agents the use of which ought to be prescribed and regulated by therapeutics. Alcoholic drinks are for humanity and society an inexhaustible source of physical, intellectual, and moral evils. To prohibit completely *fermented and distilled liquors*, to restrict the use of *fermented liquors* within the narrowest limits, seems to us to be the right and the duty of paternal and really civilizing governments."[1]

These are not the opinions which the people of America and Great Britain, with their imperfect knowledge of the dietetic value of wine, would expect to be held and still less to be uttered by a learned professor in the School of Medicine of the great city of Paris, the capital of France, the great wine producing country of Europe. Professor Fleury must have been deeply and painfully impressed with the evils of intemperance, caused by the general use of alcoholic liquors by his countrymen, when he gave utterance to opinions so decidedly adverse to their use, and at the same time to the immediate interest of a large and influential body of his countrymen, the producers and sellers of the boasted wines of Champagne, Burgundy, Bordeaux, etc., and of the distillers of brandy at Cognac and other places. M. Fleury's patriotism does not mislead him for a moment into a belief that France can stand apart and look with a compassionate feeling on other countries the people of which are given to intemperance as if she enjoyed comparative exemption. "Drunkenness is," he tells us, "widely spread in France, England, Germany, Russia, Sweden, and the United States. In France *wine* is the chief agent; in Germany and in

[1] Cours d'Hygiène, tom. i. p. 200.

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England beer and ardent spirits; in Russia, Sweden, and the United States principally that from grain. The lecturer gives nearly the same picture of the cabaret, but in darker colors, as that presented thirty years before by Villermé, which we have copied. The deeply interesting nature of the question, and a desire to still further awaken the dreamers of wine-land to a clear perception of the realities of the whole subject, induce us to repeat the language of M. Fleury: "Drunkenness at home in the midst of his family is very rare; it is at the cabaret that the workman parts, in exchange for wine or brandy, with the money which ought to go to provide food for his wife and children; it is at the cabaret he contracts habits of violence and debauchery; it is at the cabaret that he gives himself up to all the suggestions of hate and envy; it is at the cabaret that he indulges in his dreams of communism, and revolts against inevitable social inequalities, and puts himself in insurrection against hierarchy and authority."

The cultivation of the vine, so far as it relates to the manufacture of its fruit into wine and brandy, gives no activity to social progress or improvement, affords no genial incentive to the powers of man, does not quicken any germ of civilization into a display of superior industry, literature, or science; but, on the contrary, the people thus engaged are behind their countrymen, who live under the same government and institutions with themselves, in all that makes useful citizens and contributes to the sum of human worth and intelligence. Of the two divisions of France into North and South, the proportion of superficies of soil is as 18 of the first to 34 of the second, of population 13 to 17, and of agricultural laborers 7 to 11. The south contains the chief wine districts; it has a more genial climate and more fertile soil than the north, and yet, notwithstanding these differences, all to the advantage of the former division, Baron Dupin, in his work on *Productive Forces*, shows that the people of northern France derive a larger mean income per individual from the soil and from manufacturing industry and pay more taxes than their countrymen to the south. Their agricultural products are to those of the latter as 5 to 6, although the proportion of laborers, as just stated, is 7 to 11; and of surface for cultivation not much more than one half, or 18 to 34. At the time these calculations were made, the south with a greater population sent one scholar to a primary school for two sent by the north. The condition, physically and mentally, of the small laboring proprietors and laborers and jobbers is every way

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poor. They consume but little of the wine they manufacture; their chief drink is *piquette* wine, a liquor made of the wastage of the wine barrels, the remnants of grapes, etc., which are subjected to a kind of fermentation bordering on the acetous. The inhabitants of the wine regions in France are accustomed from their infancy to drink *piquette*, and it is the ordinary beverage of the poor. The people are generally sober, but thriftless and wanting in the knowledge and practice of household economy. Their amusements are "dancing, public houses, and gambling." Grain claims a vast superiority over vineyard agriculture, in reference both to the amount of food furnished to man and the profitable exchange with other countries where soils are less fertile. Mr. Tomes, who was for some time American Consular Agent at Rheims, in the midst of the "Champagne Country,"[1] describes the laborers in the vineyard, and during the season of vintage, in anything but inviting colors, or such as would make us hopeful of greater temperance among a people by the substitution of wines for ardent spirits. He tells us that drunkenness, supposed to be of unfrequent occurrence in France, is common enough in Champagne.

Still more emphatic is the language of a late traveller, Dr. Holland, in Switzerland, as relates to the cultivation of the vine for the purpose of making wine. This gentleman thinks that there can be no question that the people would be better, healthier, happier, and much more prosperous if there was not a vineyard in the canton of Lausanne, from which he was then writing. It is, he continues, the opinion of the best men in Switzerland, those who have the highest good of the people at heart, that the increased growth of the grape has been steadily and correspondingly attended by an increase of drunkenness. They lament the planting of a new vineyard as we, at home, the opening of a grog shop. It must not be forgotten that there is a close connection between the wine-press and the still, not only in their furnishing the same element, alcohol, but in the former supplying wine for distillation into brandy, and the product of the still being sent back to give strength and body to the wine reserved for home use, and especially for exportation. More than a seventh part of the wine made in France is manufactured, by distillation, into brandy. We learn from estimates made by Mr. McCulloch that for every three pipes of Catalonian wines sent to Cuba, South America, and the North of Europe, there goes with

[1] This is the title of his work, giving the result of his observations in that country.

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them more than a pipe of brandy. Nearly all the wines made are doubly alcoholized, first by the process of fermentation, and next by the addition of brandy or other distilled liquor, before they are sent to market. The assurance and the skill with which foreign wines are adulterated are not now exhibited for the first time. Redding, in his work on wines, tells us that claret is not a simple wine, or the produce of one kind of grape, or even one vintage, but is a mixture of Bordeaux and Bene Carlos, sometimes Languedoc and Bordeaux, at others Hermitage or Alicant with Bordeaux, and uniformly a portion of brandy is added to it in the proportion of six per cent. Its actual proportion of alcohol after this addition is about fourteen per cent. The information furnished by the same writer on the so much lauded Port wine is instructive. For more than a century the Portuguese have ceased to send pure wine to England. In its preparation for the English market "they did not spare brandy nor elderberries, nor burnt grain, nor anything that would answer to color the wine when it was not thought deep enough. They created at length such a wine as the world never before saw, especially when *improved* by subsequent adulterations in London, where the imitations of Port wine have been so facile, in consequence of the absence in most of that imported of the prime qualities of good wine, that a vast quantity more is sold than Oporto, with its Company, has ever been able to export."[1] And again: "Five-eighths of the wine brought to England is so coarse and such a medley of ill-flavored heterogeneous vine produce, bad Portuguese brandy, and other matters, that any ingenious person may increase one pipe to three by the addition of inexcusable articles without any fear of injury to the stomach of the consumer, or to the appearance of the wine happening." Physicians, everywhere, ought to know the real nature of the stuff which they prescribe under the supposition of its being a pure wine fresh from the London docks, and primarily from Oporto. But how much is sold of a vile compound called Port wine, of home manufacture, without its containing a drop of wine of any description, we are left to conjecture. The quantity is, however, considerable. Madeira wines receive an addition of brandy when wracked from the vessels in which they had been fermented, and another portion is thrown in previously

[1] The entire export of Port wine is twenty thousand pipes, and yet sixty thousand, as given in evidence before a committee of the House of Commons, are annually consumed in Great Britain and Ireland. Dr. C. A. Lee believes that the annual importation of what is called Port wine, into the United States, far exceeds the whole annual produce of the Alto Douro.

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to their exportation. When Madeira was a fashionable wine, every sort of deception was practised with respect to it; and after Sherry took its place the latter was soon adulterated on a large scale. It must have been quite amusing for those in the secret to see the amateurs of sherry sip and prolong the pleasures of gustation before swallowing their favorite wine which had been subjected in England to such additions as are described by Redding: "Sherry of the brown kind and low price, when imported, is mingled with Cape wines and cheap brandy, the washings of brandy casks, sugar-candy, bitter almonds, and similar preparations, while the color, if too great for pale sherry, is taken out by the addition of a small quantity of lamb's blood, and then passed off for the best sherry by one class of wine sellers and advertisers. The softness of good sherry is easily imitated." Champagne is everywhere manufactured to meet the existing demand in Paris, London, and other great cities in Europe, and in those of the United States. Not one bottle in a hundred of that which is drank in England or in this country comes from Champagne. Balls, races, dancing parties, and crowded public dinners are profitable markets for adulterated wines. The manufacture of this class of liquors is now conducted on a large scale in France itself, and not surreptitiously but as a regular branch of trade. Many curious and startling details on the subject are given in a late work, by M. Lebeuf, on the Culture and Treatment of the Vine in its Relations to the making of Wines, and the Proportions of the genuine and the artificial liquors, or those made by the addition of alcohol and spirituous essences to the original juice of the grape. The favor with which the wines of Burgundy, Bordeaux, Macon, Chablis, Champagne, etc., have been received, has tempted the cupidity of the wine merchants, and induced them, says M. Lebeuf, to make with avidity various imitations. These manufacturers undertake to manufacture all kinds of wine to order, and they often make good imitations. Did room permit, we could introduce some amusing anecdotes in proof of success, even years ago, in this way. These spurious products find a rapid sale, and some people become so much accustomed to them as often to prefer them to the real article. A similar preference for adulterated porter, in which other bitters were introduced to replace the hop, was asserted several years ago by a London brewer, in an examination before a Committee of the House of Commons. It is somewhat curious that the recipes given in M. Lebeuf's work have not a drop of the

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real wines they are intended to imitate. There are three plans for making new wine old: First, letting it become old by age; secondly, ageing it by a stove or hot-house; and thirdly, ageing it chemically. M. Lebeuf describes one of the chemical concoctions for giving age to new or manufactured wine. Many of the liquors called French clarets or other alleged products of the vintage in different parts of France are mere chemical compounds; and no more dependence can be placed on their purity than on that of the heavier and more spirituous wines of Spain and Portugal. When would-be connoisseurs inhale with apparent delight the delicate "bouquet" or perfume of European wines, purchased by retail, they are not aware, that in all but the very finest vintages this bouquet is the triumph of the chemist rather than a product of the grape.

At the great French Exposition in Paris, in 1867, there were specimens of artificial essences of sherry, port, gin, rum, cognac, arrack, Madeira, Masella, etc., which would enable fraudulent publicans and grocers to manufacture those poor compounds, called wines, with which the ignorant and unsuspecting purchasers are slowly poisoned. On a review of the whole subject, it will be seen that French experience affords small ground for our believing that protection against the evils of intemperance will be found in an extensive cultivation of the vine, and a correspondingly large production of wine. The line once passed from drinking water, as the sole beverage, to alcohol, however it may be weakened by large dilution, a desire is soon created for further stimulation by stronger drinks, until, step by step, men, and women, too, are led on from the use of the weak table wine to the highly alcoholized, bewildering, and stupefying absinthe. This is not the case with all; but who, in advance, can designate the exempt.

Opportunities are now being afforded, and will annually increase, for the people of the United States ascertaining from their own experience, the effects, considered hygienically and therapeutically, of the drinking of wine. California, a State in which everything exists, and is done on a large scale, has already thirty millions of vines in bearing, the fruit of which yielded, in 1868, more than fifteen millions of gallons of wine, and one million of gallons of brandy. The *Overland Monthly* very wisely urges the growers to make a strictly pure wine, and assures them that if this condition be complied with, the demand for the wine will exceed greatly the production. In other western States great attention is being paid to the cultivation of the grape-vine. There are said to be three thousand acres de-

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voted to this object within a radius of fifty miles from Keokuk, Iowa. The product of wine from the cultivated grape is quite considerable in Ohio, North Carolina, etc.

Nearly 5,000,000 acres of land in France are given to the cultivation of the vine, which affords occupation, in one way or another, to upwards of 5,000,000 of persons. The vintage in 1868 amounted to 1,620,000,000 gallons, and the annual average value is estimated at $100,000,000. Some French writers have rated it in former years as two hundred millions. One department alone, Herault, produced in 1864 three times more wine than Portugal.

After this exposition of the "wine question" made on the evidence and experience of judicious and independent observers, what shall be said of such a flippant way of disposing of a grave question as is attempted in the following language: "And in the day when every farmer can, from half an acre of land, easily and cheaply planted and tilled, even by the unskilful, harvest what will fill his ten or twelve barrels with honest juice, for the habitual daily drink of himself and family—our two heavy afflictions and sins, excessive water drinking and excessive whiskey drinking—will vanish from the land, and a beneficent change in our national temperament begin to be wrought."[1] The great cordial of life, according to this writer, is red wine, which he recommends to be taken daily in the quantity of a quart for every adult, and of a pint for each child. The age of the latter is not specified. Is the drinking to be begun when the little being is yet at the breast, imbibing its mother's milk? And this is the prescription which we are assured "will prevent and cure dyspepsia." Far different from this is the opinion held by French medical writers, who are familiar with the effects of the drinking of wine dietetically and medicinally considered. Fodéré,[2] for example, says: "If my opinion were asked on the necessity of using wine in a state of health, and as a hygienic agent, I would frankly reply with Plato"—Galen might have been also cited—"and after what I have seen of the evils caused by it, that it would be much better not to accustom children to its use, and that we have no call for this factitious stimulus until the approach of old age." This writer, who is the author of a standard work on *Legal Medicine and Public Hygiene*, refers to his experience in the treatment of children of all ages at the Medical College of Strasbourg, and adds that boys in good health especially have no need

[1] Three Seasons in European Vineyards, etc., p. 20. By Wm. J. Flagg.

[2] Dict. des Sciences Méd., art. *Vin*.

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of wine during the period of their growth, and that this liquor, of which too indulgent parents are afraid to deprive them, so far from being beneficial, disposes them, on the contrary, to serious and fatal diseases, among which he specifies hæmoptysis, pulmonary consumption, and mania. Pomme, author of an excellent work on hysterical and hypochondriacal diseases,[1] those which are so often supposed to require the exhilarating operation of wine and analogous liquors, cautions invalids against their use, and declares emphatically, that both nature and common sense clearly point out water as *the only fitting drink.*

Whatever misgivings may be felt by the advocates of temperance, as regards the general use of the fermented juice of the grape, and however reasonable their dread of its being made to undergo a farther and deleterious change by distillation, there can be no question of the sanitary benefits ensuing from the extensive cultivation of this fruit for its legitimate ends, viz., to gratify the palate, quench thirst, and be a real "accessory food." While thus to a certain extent nutritive, it is also medicinal. We may not look for a complete arrest of pulmonary consumption by the "*cure de raisins,*" or a diet consisting chiefly of bread and grapes; but we cannot reject the testimony in its favor in chronic bronchitis associated with irritable dyspepsia, and, also, in hypochondriasis, dysentery, and certain diseases of the skin and renal organs. Grapes might well enter into the dietary of persons of all ages, from childhood to the most advanced period of life, and would prove to be alike grateful to those in the enjoyment of health, and to those wracked by pain and fever. Vineyards may be spread over the country and their natural unsophisticated fruit product be made an article of lucrative commerce, not only by its consumption on the spot where it is grown and in the season of vintage, but, also at a distance, both in its recent state, and when dried so as to become raisins. With the increased means of preserving fruit fresh on a large scale and of transportation to any part of the United States, the inhabitants of regions remote from the favored lands of the vine will be able to procure grapes in even greater abundance than they now do apples, oranges, lemons, and figs, not to speak of the more tender pineapple and banana. California and other vine districts will supply us on the Atlantic side with fresh grapes in quantities a thousand-fold greater, and of more varied flavor than we now receive

[1] Maladies Vaporeuses des Deux Sexes.

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from the Mediterranean. The practice of gathering grapes just before they attain maturity and of divesting them of any adherent moisture, and then of packing them away in some light and dry substance, was known to the ancients. Grapes were called by the Romans *uvæ ollares* when they were put away in jars hermetically sealed with pitch, or in well-closed vessels with dry straw. California, the vegetable productions of which are on such a grand scale, will, no doubt, soon grow grapes of a size to rival those of the bunch found in the valley of Eschol, that required two men to carry it, or those of Damascus of the present day, which have been found to weigh twenty-four pounds to the bunch.

The juice of the ripe grape consists of sugar, gum, albumen, fatty matters, pectic acid, pectates of lime, potash and soda, acid, bitartrate and tartrate of lime, and alumen. Also sulphate of potash, chlorides of potassium and soda, phosphate of lime, oxides of iron, silex, and essential oils. Sugar, gum, and gluten are in quantity available for nutrition in the juice of the grape; but by the process of fermentation into alcohol they are changed, and show themselves in much smaller proportion. Your reporter draws from his work, already quoted, the following particulars on the use of the unfermented juice of the grape, which, together with "the sap of the palm-tree, are, as we learn from Captain Charles Stuart, common and delightful beverages in India, Persia, Palestine, and adjacent countries. *Must*, or the expressed and unfermented juice of the grape, was used by the Egyptians at an early date (Gen. xl. 11). Another mode of using the juice of the grape for the purpose of drink was to evaporate the more watery portion, by which the remainder was thickened and could be kept for a length of time without farther decay. When wanted for use, it was made with the addition of water, not only a refreshing, but a somewhat nutritive drink, as its mucilage or extractive matter and sugar were still retained. Dr. Russell, in his history of Aleppo, thus speaks of the practice in modern times, in that part of the world: 'The inspissated juice of the grape (*sapa vini*) called here *dibbs*, is brought to the city in skins and sold in the public markets: it has much the appearance of coarse honey, is of a sweet taste, and in great use among the people of all sorts.' This extract, as it may be called, of the juice of the grape, mixed with water and allowed to remain in this state for a time, would undergo a slight acetous fermentation, rendering the drink analogous to the light ascescent wines used by the people of southern

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Europe, or to the *piquette* already described."[1] In all ages, writes Fodéré in the *French Dictionary of Medicine*, previously quoted, the rich have drunk wine and the poor piquette, but the latter class, sober from necessity, have, also, always enjoyed better health than the rich. Piquette (*posia* or *lora*) has been called secondary wine. This was the drink issued as part of their daily allowance to the farm laborers and slaves, by the ancient Roman landholder. In parts of Asia Minor, the Turks make a thick confection of grape juice, *raisiné*, which they use largely as a condiment in place of sugar or honey.

There is yet another state in which grapes are largely used, viz., when partially deprived of their watery part by drying, but still retaining their sugar, mucilage, and an acid. The fruit thus prepared is known as raisins; in some places it is dried in the sun, in others immersed in lye. In all cases, it is desirable that the grapes should be perfectly ripe before they are gathered, and in order to secure this result, the leaves and branches which partially cover the bunches of the fruit are drawn to one side so as to expose it fully to the sun. The damaged berries are carefully removed. In eating raisins, care should be taken not to swallow the skin and seeds, both of which are indigestible.

People often speak of wine and the juice of the grape as equivalent terms, and hence regard the former as a natural product, obviously intended for man's use and enjoyment. Wine is no such thing; it is the product of carefully elaborated and artificial processes, necessary to encourage fermentation and to keep this latter within certain limits, passing which the liquor would lose its alcohol and become vinegar. The juice of the grape left to itself soon runs into the acetous fermentation, and this change gives us the really natural product, the true resulting liquor, but not wine. Alcohol is always a stranger, and with few exceptions an enemy in the human organism; acetic acid, on the contrary, is found in the gastric juice, and aids digestion. Vinegar was part of the ration of the Roman legionaries, the conquering soldiers of the republic; with it they quenched their thirst after long marches, and mitigated by mixture the effects of bad water. One can hardly procure a more refreshing and cooling drink during the dog days than vinegar and water, to which molasses is added. To workmen exposed to the sun, it offers every advantage over any of the alcoholic liquors. Next to salt, vinegar should be regarded as a universal condiment.

[1] Regimen and Longevity, pp. 231, 232.

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Diluted with water it is most refreshing and curative in most forms of fever, and might be turned to good account in many chronic affections.

MALT LIQUORS.—If wine be regarded as the natural drink of the French people, malt liquors bear the same relation to the English. The proportion in quantity of the former to the latter is about as three to two, and in the amount of alcohol, of which they are the bearers, as 9 to 5. The drinkers of malt liquors by the laboring classes of Great Britain pursue nearly a parallel course with the wine drinkers of the same class in France. They begin with small beer, and they end with gin. The use of these liquors by the English people for so many centuries might be adduced in their favor, for we may suppose that the revelry and dissipation in Harold's camp on the night preceding the fatal battle of Hastings, were kept up by large potations of the national beverage. "Considered dietetically, beer possesses," according to Pereira,[1] "a threefold property; it quenches thirst; it stimulates, cheers, and, taken in sufficient quantity, it intoxicates; and, lastly, it nourishes or strengthens." "From these combined qualities, beer proves a refreshing and salubrious drink (always presuming that it is used in moderation), and an agreeable and valuable stimulus and support to those who have to undergo much bodily fatigue." The friends of lager beer, which is beginning to be drunk so largely in many parts of the United States, will doubtless hold the same language with the English writer just quoted. Franklin, however, showed long ago, when he was a journeyman printer in London, that he got more nourishment and strength from his penny loaf and pint of water than his associates from their free draughts of beer. Similar experience has been obtained from large numbers of working men in England, who have been induced to abstain entirely from beer and all intoxicating liquors. Abstinence of this nature is the more called for on account of the wholesale adulterations of beer, and especially porter, in that country. *Cocculus Indicus* is used to increase its intoxicating quality; and some of the popular treatises on brewing give directions for employing it. As the use of this poisonous article is prohibited by the legislature, and heavy penalties imposed for infraction of the law, brewers' druggists are in the habit of preparing a watery extract of the fruit, which is sold as *black extract*, or *hard multum*.

[1] On Food and Diet.

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Quassia is used for hops, to communicate a bitter taste; grains of Paradise and Cayenne give pungency; coriander, caraway, etc., are used to communicate flavor; liquorice, treacle, and honey give consistence and color. A mixture called *beer-heading*, composed of green vitriol (sulphate of iron) and common salt, is used to give a fine frothy or cauliflower head to beer. If to this list we add *nux vomica*, or now its more readily measured alkaloid, strychnia, and opium, henbane, foxglove, oil of vitriol, and jalap, we can form an opinion of the real nature of the English compounds called malt liquors, and of the extent of confidence to be placed in them, either for dietetical or medicinal purposes. It is to be hoped that the brewing in this country is of a more honest character, and that they who drink American-made beer, ale, and porter will not be subjected to more than the effects of the true fermented liquor from grain, with the addition of hops, and not be made to suffer from any imitation of a popular brew and its additions on the other side the water. Little can be said in favor of the much-dwelt-on nutritive property of malt liquors, if we receive as correct the statement of Liebig, that fourteen hundred and sixty quarts of the best Bavarian beer contain only the nutriment furnished by a two and a half pound loaf of bread. Beer is a common beverage in the northern part of France; in quantity, it is equal to about a tenth of the products of the vine in that country. Cider is also made and drank in nearly the same proportion in Normandy, and the adjoining districts. But of all the countries of Continental Europe, Germany is the one in which the manufacture and consumption of beer are the greatest. The national practices in these respects are kept up, to a great extent, by the Germans who have settled in the United States, and lager beer has become as famous among us as brown stout and Burton ale in England. The proportion of alcohol in the malt liquors of this latter country is one per cent. in smaller beer, and eight per cent. in the best brown stout porter.

CIDER, or apple-wine as it has been sometimes called, contains from five to ten per cent. of combined alcohol, and it is often made stronger by the addition of distilled spirits, in order to preserve it from acetous fermentation. It is a pleasant drink, and its use has sometimes been contrasted with ardent spirits, as less alcoholic and so far safer; but it is often productive of colic and otherwise disturbed digestion, and, like all the alcoholics, it will, when

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freely used, intoxicate, and induce an appetite for stronger liquors. Hence, if a person wishes full protection for himself against the risk of intemperance, he will put it on the list of intoxicating drinks, from the habitual use of which he should abstain. There is nothing either in the health or habits of the inhabitants of the cider counties in England and France to make it desirable that its manufacture be extended in this country. The perverse ingenuity of man has not been content with converting the juice of the apple into a drink of doubtful value by fermentation, but has compelled it to yield, by distillation, an ardent spirit, and thus add to the number of the most pernicious and destructive alcoholics.

Alcohol Powerless in Resisting Cold.—Having spoken of the various combinations of alcohol with water and other substances in the different liquors most commonly used as drinks, we shall now inquire into the validity of the claims set up for them on the ground of their imparting additional strength and power of endurance under exposure to extremes and vicissitudes of temperature and weather generally. In anticipation of the conclusion to be reached, we shall invert the customary proposition, and affirm that the recorded experience of men in all situations and climates, and under all kinds of labor and exposure, proves that abstinence from intoxicating drinks gives increased ability to go through the labors of the farm and the workshop, and to encounter hardships by sea and by land beyond what has ever been done in these respects under the unnatural excitement of alcohol, followed, as it always is, by depression and debility, if not by fever and other diseases. First, as regards alcoholic liquors being a preventive against cold. On this point there is a singular unanimity of opinion among voyagers and travellers both by land and sea, in their condemning the use of distilled spirits, or of wine or beer, as a preventive against cold. We may mention as holding this view, Sir James Ross, Sir John Richardson, Sir John Franklin (first voyage), Captain Kennedy, Drs. Kane, Hayes, and McRae, and all Arctic explorers. In North America, the Hudson Bay Company entirely excluded the use of spirits by all persons in their employ. The Russian army, on the march in cold weather, not only uses no spirits, but no man who has lately taken any is allowed to march. In the Antarctic regions, we have the testimony of Dr. Hooker and the practice of many "teetotal" whalers to the same purport. Dr. Hayes says that he not only will not use spirits, but he will take no man with him on an Arctic voyage who is accustomed to their

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use. Sir James Ross, the commander of two different expeditions in search of a northwest passage, asserts that of two equal boats' crews in a heavy sea, the water-drinkers will far outdo the others. Dr. Kane, in a conversation on the subject, told your reporter that spirituous liquors may be of use for a momentary effect, but they are decidedly deleterious where continuous exertion and sustained labor are required. The Rev. W. Scoresby, who was engaged in so many whaling voyages in the Arctic regions, says emphatically that spirits are decidedly injurious in cold climates. "The men who have been assisted by such stimulus have been the first who were incapable of duty. They became perfectly stupid, skulked into different parts of the ship to get out of the way, and were generally found asleep." This gentleman adds: "In the case of a storm or sudden difficulty, I should most decidedly prefer the water-drinkers to those who were under the influence of any stimulant. The latter are unspeakably more liable to accident." In 1619 the crew of a Danish vessel, sixty in number, and fully supplied with provisions and ardent spirits, attempted to pass the winter in Hudson's Bay, but there died fifty-eight of them before the spring. Very different was the result of a similar wintering by an English crew of twenty-two men, who had no spirituous liquors; they lost but two of their number by death. In another instance, of eight Englishmen, also without spirituous liquors, who passed the winter in the same bay, the whole of them survived and returned to England. More remarkable still was the case of four Russians who were left without ardent spirits or provisions in Spitzbergen, and who lived six years in that cold and dreary region, and ultimately were restored to their country. Dr. Aiken, in a paper published in the first volume of the *Transactions of the Literary and Philosophical Society of Manchester*, says, after his examining and comparing a good number of narratives of parties who attempted to pass the winter in high northern latitudes, that in all the instances of failure, vinous and spirituous liquors had been used, and probably in considerable quantities. The Greenlanders, who are the most civilized, perhaps we ought to say the least barbarians, of the people who inhabit the regions around the Pole, are remarkable for their sobriety and entire abstinence from intoxicating beverages. They contrive, notwithstanding, to keep warm, and laugh and grow fat and enjoy themselves at the intervals when not engaged in their fatiguing and perilous fishing expeditions. Their intemperance consists in the excessive use of

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coffee, "kavit." It is not probable that a supply of alcoholic drink would have enabled one of this people, named Caleb, an assistant to the missionary of Lichtensfels, to survive, as he did, an exposure of two days and a night in the open air, while the thermometer was at zero. At night he drew his kajak, or boat, upon the ice, and slept on it in a sitting posture. On his return home, he merely complained of thirst, though he had tasted no food during the whole time of his absence. The narrator of this incident adds that such privations are of common occurrence among these hardy natives. The table-talk of the Greenlanders is often kept up for several hours after dinner, without the incitement of the bottle; the chief theme is a seal-hunt, which, whether we regard the animal or the exciting nature and risk of the chase, is to the full as interesting as a fox-hunt told and talked about by more civilized and Christian men in their cups, or perhaps half-seas over. The noble reindeer, the friend and servant of the Laplander, keeps up its animal heat and muscular strength and activity on very reduced respiratory and nutritive elements, viz., grass in summer and moss in winter. The amphibious walrus contrives to be fat and strong, and to take long sleeps on the ice; and the mighty whale, with all the disadvantage of long and frequent immersion in the cold water, breathes fully and with good effect, and sustains its ponderous body in strength and activity, and its animal heat up to 104° F., on food not particularly abounding in fats or carbohydrates, or mixed with alcohol in any shape. Equally precise and explicit with maritime experience is that derived from the testimony of all those persons who have been engaged in travel or hard work on land, in high latitudes or in the inclement seasons of more temperate climates, and at the same time have been abstinent from intoxicating drinks of any description. What can now be said of the intrusion of chemistry on hygiene in a question affecting the health and morals of all peoples by its teaching that alcohol was a generator of heat in the organism, and so far helped to protect from the operation of cold? It would have been difficult, if not impossible, to offer a more plausible and at the same time a more pernicious persuasive for the inhabitants of cold and temperate latitudes to indulge in the large use of intoxicating drinks, with all its attendant perils, than this chemical speculation of Liebig and his school, which universal experience proves to be utterly without foundation. The subjoined cautionary remarks of the eminent philosophical chemist Lehmann cannot be too strongly impressed on our minds, when our

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faith is asked to rest on the deductions of the laboratory in place of observations on man himself: "In our application of chemistry to physiology, we must be especially mindful of the fact that most of the fundamental propositions which at the present time have attained to a general recognition in chemistry by no means possess such a degree of scientific, or rather of logical, exactness as to place them beyond all dispute. We must not forget that chemistry, like medicine and theology, possesses a dogmatism of its own." How much better would it have been for the health and lives of the people if, instead of their being led away by the ingenious speculations of the chemist, they had attended to and acted on the opinion of the experienced and philanthropic Rush, when he said: "There cannot be a greater error than to suppose that spirituous liquors lessen the effects of cold upon the body. On the contrary, I maintain that they always render the body more liable to be affected and injured by cold. The temporary warmth they produce is always succeeded by chilliness."[1] Not drunkards only, but free drinkers of alcoholic liquors, incur the greatest danger of frostbites, and of the loss of life itself, on exposure for any length of time to great cold. Whereas, they who abstain from such liquors can, as we have seen, bear up under the extremest diminution of temperature. Their protecting beverage will be tea or coffee, which Dr. Smith has shown to be true excito-respiratory agents. Mr. Atkinson, an English painter, who travelled from Russia proper through Siberia, amusing himself the while by sketching and hunting, declares that in tea he found the best cordial and dietetic protection against cold and fatigue, whereas spirituous drinks entirely failed to answer these purposes.

Alcohol Powerless against Heat.—Alcohol, which was to protect against cold, was also to perform a wonder-working part in mitigating the effects of heat. Blow cold, blow hot, it was believed to be a ready and reliable friend. Facts innumerable now show that its promise is false in both cases, and that it lures those who confide in it to their destruction. The best authorities on tropical diseases—Drs. Robert Jackson, Henry Marshall, Ronald Martin, Parkes, and many others—speak strongly against the use of spirits. Not only is heat less well borne, but insolation is predisposed to under the influence of this cause. Dr. Jackson, who was at one time at the head of the medical staff in the West Indies, expresses

[1] Inquiries into the Effects of Spirituous Liquors upon the Human Body, and their Influence upon the Happiness of Society.

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his firm conviction that an English soldier may be rendered capable of going through the severest military duty in the hottest islands of the West Indies, and that temperance will be one of the best means of enabling him to perform his duty with safety and effect. Dr. Jackson, when giving incidents of his own personal experience, specifies more particularly a journey he took on foot in the island of Jamaica, of four days' duration, in the first of which, setting out at twelve o'clock, he walked eighteen miles before dark, and on the three following ones a hundred miles. This was done at a time and in a climate in which the consequence of walking any distance on foot was believed to be dangerous, and to cause sickness if not death. In this journey the traveller attributes his escape to temperance and spare diet. "I breakfasted," he says, "on tea, about ten in the morning, and made a meal of bread and salad after I had taken up my lodging for the night. If I had occasion to drink during the day, water or lemonade was my beverage." Dr. Marshall, inspector of hospitals, in commenting on the narrative and opinions of Dr. Jackson, observes, "I have myself marched on foot with troops on actual service, in a tropical climate, where the mean temperature was considerably higher than that of Jamaica, without any other beverage than water, and occasionally a cup of coffee. So far from being calculated to assist the human body in enduring fatigue, I have always found that the strongest liquors were the most enervating, and this in whatever quantity they were consumed; for the daily use of spirits is an evil which retains its pernicious character through all its gradations; indulged in at all, it can produce nothing better than a diluted or mitigated kind of mischief." Testimony equally strong on this head is borne by Dr. Mosely, also an English army physician, in his volume on the Diseases of Tropical Climates. "I aver," he says, "from my own observation and custom, as well as the custom and observations of other people, that those who drink nothing but water, or make it their principal drink, are but little affected by the climate, and can undergo the greatest fatigue without inconvenience, and are never subject to dangerous or troublesome diseases." Of the like purport is the emphatic language of Dr. Bell, a respectable writer on the Climate and Diseases of the West Indies. "Rum, whether used *habitually*, *moderately*, or *in excessive quantities*, in the West Indies, always diminishes the strength of the body, and renders men more susceptible of disease, and unfit for any service in which vigor or activity is required."

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If we turn to the recorded experience of medical men who have served in the East Indies, and who have written on the hygiene and diseases of those countries, and especially of India, we shall find it to be equally adverse to the use of alcohol. Dr. Parkes[1] says expressly: "The common notion that some form of alcoholic beverage is necessary in tropical climates is, I firmly believe, a mischievous delusion." The records of the 84th regiment, he tells us, show that from 1842 to 1850 it numbered many "teetotalers," at one time more than 400 in its ranks, and that both on common tropical service and on marches in India, the teetotalers were more healthy, more vigorous, and far better soldiers than those who did not abstain. General Havelock and his "saints," as his religious and temperate men were mockingly called, were always selected by the commander-in-chief, when an expedition requiring great promptness, decision, and boldness was to be carried out. The experience of almost every hunter in India is to the same effect. As regards service and exercise in the tropics, we have the testimony of Ronald Martin that warm tea is the best beverage, and this will be corroborated by every one who has made long marches or hunting excursions in India. Sir John Hall, Inspector-General of the British Army, gives as his own experience, that neither spirits nor wine, nor malt liquor is necessary for health. The healthiest army he ever served with, that in the Kaffir war, at the Cape of Good Hope, had not a single drop of any of them. In Algeria the French soldiers find coffee to be their best cordial and preservative. Alcohol, says M. Périer, is our worst enemy, the real and most cruel wound of Algeria. We believe that the medical and surgical records of the late war will show that in our own country, as it has been shown in tropical regions, that the probabilities of exemption from disease, and the power of enduring the greatest and longest strain on the muscular system, and the entire locomotive apparatus, are in the direct proportion to which abstinence from all intoxicating liquors is carried out.[2]

Transitions of temperature and the rapid passage from one extreme to another are peculiarly trying to the constitution, and prove a frequent cause of disease. But these trials are better borne by the temperate, that is to say, the abstainers from intoxicating drinks than by the intemperate, or the persons who habitually indulge in

[1] Manual of Practical Hygiene.

[2] See Dr. Flint's volume for U. S. Commission.

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the use of these drinks. General Cass used to say that he never used ardent spirits, and in the variety of atmospherical exposures to which he had been subjected, he had every reason to be pleased with his abstinence. General Howard, with still rougher experience, will bear similar testimony of himself. Professor Edgar, of Belfast, relates the case of a man who had been for thirty years in the British army, and in twenty-seven general engagements, had suffered from every vicissitude of weather, and had, not unfrequently, found his companions dead with cold by his side. He attributes the preservation of his life and of that of five others, who left England at the same time with himself, to his having abstained from strong drink. A gentleman who heard the narrative of this case at a public meeting rose and said: "I feel myself called upon to corroborate the statements which have been made, by detailing the results of my own experience. I served thirteen years in the hottest climates. I have since been exposed to the severest winters of Canada, and to the rapid changes of American climate; I have nine times crossed the Atlantic; and I attribute my sound health, now at fifty years of age, to my having abstained entirely from all intoxicating liquors." Sailors can now encounter extremes and transitions of temperature, from a tropical to an arctic climate, or the reverse, and often associated humidity, and yet preserve their health and alacrity to perform their duty, without a drop of spirituous liquor aboard their vessels. Their commanders know this, and if abstainers themselves, they will select their men accordingly; and insurance offices, fully alive to the fact that there is diminished risk of the loss of a vessel at sea with a temperate crew and a temperate captain, will ask a lower premium than they would under other circumstances. The following incident will serve to enforce the soundness of these views. Some years since a vessel going from Virginia to New York was overtaken by a storm, which raged with great violence, and continued for a long time. All the sailors on board who drank ardent spirits gave up and ceased to labor, under the combined influence of fatigue and despair. There was, however, one man on board who drank no ardent spirit, and although he with the rest had been exposed to the buffetings of the storm, he took the helm, and stood at it for six hours after the others had ceased to make any exertion, and the whole crew were saved. Had it not been for this water drinker it is most probable that both vessel and crew would have been lost long before the storm abated. It has been too truly

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said by a distinguished navigator: "The great day of account will bear terrible witness, when the sea shall give up the dead that are in it, of the vast and unsuspected extent of the sacrifice of life among seamen from shipwrecks and other catastrophes occasioned by drunkenness."

In former times, so soon as a vessel was aground and threatened with wreck, or in mid-ocean came in danger of foundering, the crew, in place of redoubling their efforts, under the orders of their officers, to save the vessel, would make their way to the liquor room, and breaking open the vessels containing it, drink themselves into a state of helpless and hopeless drunkenness. At the present time there is less risk of shipwreck, not only on account of a better knowledge of navigation, but also of greater temperance among sailors and their officers; and even when this catastrophe does occur, there is greatly increased probability of the lives of all on board being saved, owing to the captain retaining his coolness and judgment, and the men being sober and ready to obey orders, the seductive poison being no longer at hand. With a bottle of strong alcoholic drink at his elbow, and a belief that he may use it with benefit, no man is sure of his conduct in any critical emergency of his life. He takes a glass in advance, to give him, as he imagines, additional strength and readiness; he takes a second one to make sure of the hoped-for effect, and a third, that there may be no mistake; but at the trial moment he discovers, when too late, that his strength and resolution, and clearness of mental vision are gone.

Your reporter would state a case in point, coming within his own observation, although it dates more than fifty years back—May, 1818. The vessel on which he was aboard, as physician, was approaching the coast of China after a voyage of nearly six months from Leghorn. The captain, an excellent sailor, and equal to all the emergencies of sea life, was pacing the deck, on the lookout for a pilot; and as the air was close and sultry and he thirsty and anxious, he called to the steward to bring him his customary drink, a glass of grog—rum and water. But soon the call was renewed for another glass, and again for a third, and a fourth time were heard the words, "Steward, bring me a glass of grog." Both the doctor and his friend the supercargo became uneasy at this state of things; and the former went up to the captain and in a kindly tone asked him if he was aware how often he had called for grog. The reply came that he was not, and he immediately thanked the doctor for

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reminding him of the fact. This captain, like most nautical men in those days, was in the daily habit of drinking ardent spirits, but never to the extent of inebriety. He took his grog with his biscuit and cheese, as a matter of course, every day at noon, after having made his observations, "taking the sun," in order to ascertain the latitude; and he used to repeat the draught at intervals through the day. On the occasion now described he only meant to indulge in a glass or two extra, moved thereto by thirst and anxiety to get safely into Canton, where he had never been before. He had brought his vessel from Philadelphia to the Mediterranean and thence over the Atlantic and Indian Oceans and China Sea, without the loss of a spar or a sail, and he counted on terminating his long voyage successfully in a few hours more, with reputation to himself and profit to his owners. And yet, if a friendly voice had not reached his ear at the critical moment, he would have continued his calls for grog until he had become a helplessly drunken and a disgraced man. After his return home he had charge of a vessel in another voyage, and then he remained on shore, becoming more and more a slave to strong drinks, until he finally sank under an attack of delirium tremens. On relating the above case to a friend, he told of a similar one to which he was himself a witness. On a dark and stormy night the vessel in which he was a passenger was close to the coast of Cuba, and was in imminent danger of being driven on shore, which would have been followed by the loss of life of all the persons on board. The captain, dead to every sense of duty, set in drinking until he was taken completely drunk to his berth, and the vessel was, of necessity, left to the charge of a young and inexperienced mate, who providentially brought her off in safety. On how many occasions in common life ought not the warning voice of the physician against the habitual use of alcoholics be heard. His interposition may not be necessary for the safety of a vessel and her crew, but it will be for the happiness and well-doing of a family when the head of it is imperilling them all by his free use of the deleterious and maddening draught.

In the exposures to extreme heat, as in foundries, glass-blowing establishments, and the like, the men engaged in them are less exhausted by heat and sweating if they drink water than if they use alcoholic liquors; and it has been found that those persons who are exposed to wet and vapor, as hatters, dyers, etc., in their daily work escape most of the diseases which had been regarded

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as the unavoidable consequences of these occupations, but which experience now shows are mostly brought on by the use of ardent spirits, or the excessive potations of malt liquors. Whatever is wanting to increase the infirmities caused by long confinement in crowded manufactories and work-rooms is found in the use of distilled and fermented liquors by the operatives in these places. On the other hand, these persons can be placed on as good a sanitary footing as any other class in the community by their getting the benefit of an improved hygiene, which would consist in abstinence from alcoholic liquors, ventilation of the rooms in which they work, and a limited number of hours at their task. Farm labor of every kind, in all seasons, is now carried on to a considerable extent and more satisfactorily by abstinence from intoxicating drinks on the part of all—from the owner of the farm to the stripling who is just beginning to work in the field. The harvest is gathered in more readily and cheerily by all those engaged in it where coffee or chocolate takes the place of whiskey or other equivalent alcoholics. There are fewer cases of cholera morbus, colic, or dysentery among the temperate at this season than among the habitual, not to speak of the excessive drinkers.

Alcohol no Imparter of Bodily Strength or of Mental Vigor.—Of the many fallacies of opinion on the action of alcohol, there is no one so widely spread and generally accredited, and, at the same time, so entirely groundless, as that which assumes its power of increasing the strength of the body either for occasional display or enduring effort. We would say, with Dr. Parkes, that if we look upon the body as an agent of work from which we desire to obtain as much mechanical and mental force as is compatible with health, we can consider the effect of alcohol *per se* as simply a means of diminishing this development of force. This truth has been abundantly demonstrated in our preceding statements of the superior ability to encounter bodily strain in every variety of climate and situation in which men are required to exert their muscular force. In the training of the Roman athletes, as well as of the modern pugilist, we find strict temperance to be an indispensable condition. To the former all sensual enjoyments were prohibited, whether in devotion to Bacchus or to Venus. "*Abstinuit venere et vino*" was, according to Horace, the course pursued by a youth who was desirous of reaching the goal first in the race. Modern trainers are somewhat divided in opinion as to the advantage of allowing a small quantity of wine or of malt liquors; the best trainers do not

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give any intoxicating drink. But all are agreed in never permitting the use of ardent spirits on any consideration whatever, even when diluted with water. This is the declared experience of a late successful pedestrian, Weston. Horses in training for the turf and the chase attain their greatest speed and bottom without any alcoholic drenching. Milton, himself an example of the inspirations of genius unclouded by alcohol, has left those oft quoted lines in reference to Samson, in which he exclaims:—

> "O madness! to think use of strongest wines
> And strongest drinks our chief support of health,
> When God, with these forbidden, made choice to rear
> His mighty champion, strong above compare,
> Whose drink was only from the liquid brook."—*Samson Agonistes.*

To make the lesson complete in this case, let us bear in mind the strong injunction of the angel of the Lord, when he appeared unto the wife of Manoah, and promised that she who was now childless, should bear a son, a chosen champion, to deliver Israel out of the hands of the Philistines. "Now, therefore, beware, I pray thee, drink not wine nor strong drink." And at a subsequent visit, when Manoah besought the heavenly messenger to tell him "how to order the child," he received for answer: "Of all that I have said to the woman let her beware. She may not eat of anything that cometh out of the vine, nor drink wine nor strong drink." This reiterated injunction of the angel has not been taken to heart by expectant mothers and their medical advisers in succeeding times; and the more the pity, for although women are not expected, now-a-days, to be the mothers of Samsons, they are all of them desirous of giving birth to healthy children. But, too frequently they allow their wishes in this respect to be counteracted by certain longings of another kind, and they crave a stimulus "to keep them up," when occasionally depressed and languid; and, too often, physicians are ready to humor them by prescribing a glass of ale or porter, or of wine; or, most convenient of all, the now inevitable milk-punch. To what extent the child *in utero* must suffer from these alcoholic indulgences of the mother, we may have some idea by our knowing the disastrous consequences to the child at the breast from her drinking malt liquors, with the expectation, forsooth, that they will increase her flow of milk. Convulsions and death of the child have followed this false practice.[1] On an important part of the hygiene

[1] Combe, Andrew, on the Management of Infancy. Edited by Dr. Bell.

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of pregnancy, we would recommend to pregnant women and their medical advisers a careful reading of the thirteenth chapter of "Judges."

The vulgar error, as we believe it may now be called, that spirit rations to soldiers are necessary to sustain them under long marches and debilitating influences incident to a campaign, would never have been indulged in if ministers of state and leaders of armies had drawn a little on their historical readings. These persons might have learned that the Roman legionaries, conquerors of the world, knew of no other drink, in the earlier days of the republic, than water, with, at times, the addition of a little vinegar. The history of Mohammedan conquests shows that the followers of the "prophet" became masters of the best parts of Asia and Africa and Spain, and at one time threatened to overrun all Europe, without recourse to the stimulus of wine or other alcoholic drinks, all of which are strictly prohibited in the Koran. We have, in a preceding passage of this report, said something of the capabilities of water drinking soldiers at the present day to show their martial prowess and bodily strength. In common life, porters, carmen, and others, who are obliged to lift and carry heavy weights, have in many instances made the agreeable discovery that they have more strength for their work, and feel less exhaustion after it when they became water drinkers than when they used alcohol. "I have backed as many as sixty tons a day with perfect ease," said a London coal whipper, "since I took the pledge. But, before, I could scarcely have been able to crawl home, certain to have lost the next day's work." Alcohol stimulates, it may be, for a short time the nervous system, and through the latter, the muscular, and hence it may serve as a goad to incite to a great temporary exhibition of muscular strength; but this is soon followed by exhaustion proportionate to the previous excitement, and there ensues inability to keep up to the ordinary standard of work. With the water drinker "there is no lassitude, headache, feverishness, foul tongue, or aching limbs next day, even after the hardest labor. All is fresh, and supple, and free; there is no reaction." Alcohol cannot nourish or give strength; it cannot give working power; it can only hurry the expenditure of what we already have; and, besides, it hampers and opposes in getting that store renewed. The attempt at bodily recruitment of a laboring man by his taking a glass of brandy or whiskey is often the beginning of a habit that leads to drunkenness.

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If the brain be the organ of the mind, or rather a congeries of organs, the functions of which are displayed in the operations of the mental faculties, we may readily see that there can be no thorough work done by the mind unless its instrument or instruments be in a good condition. The brain is the first in the order of time, and the chiefest, in comparison with other organs, to receive the impressions made by alcohol after its reception into the stomach; and in the increased fulness and congestion of the cerebral vessels and the temporary poisoning of their blood occurs the material cause of the symptoms of inebriety. For the mind to work freely, fully and reliably, and with consistent measure, and to be able to dive into and explore the mysteries of science and philosophy, or to soar on the wings of poetry and song into the blue empyrean, a healthy brain is necessary—a brain not alcoholized, not exposed to alternate excitement and depression, or stimulation and narcosis. Of such a brain, with a capacity for immense labor, was that of Newton, a vegetarian and water drinker, eschewing all alcoholics; of such, also, were the brains of his great successor, La Place, and of Locke, of Milton, Cowper, Wordsworth, etc. Through murky vapors raised by alcohol there may still be found, at intervals, corruscations of genius, snatches of wisdom and critical acumen, but there will be wanting the steady light to illumine the landscape, and to enable the mind to see every object in its true place and proportion. We have, now and then, examples of the brain—in the same person—working during an interval of some length between its healthy and its morbid state—as in the case of Byron, who wrote the two first cantos of "Childe Harold" when a water drinker, and "Don Juan" when a gin drinker and a chewer of tobacco. Mistaken notions of the real character of alcohol have led many students and writers to attempt to spur on their jaded intellects to additional exertion in the still hours of night by their taking alcoholic stimulants, in place of seeking rest and the true means of renovation in sleep. Lord Brougham, a man of wonderfully diversified faculties and power of work, suffered greatly in the latter period of his life from this cause. He was fortunate enough to acquire fame, eminence, and honor for his vast labors in the cause of education, law, and social reform before he became a drunkard. Most men, who attempt the perilous experiment, fall into habits of intemperance before they can accomplish the work that was to give them fame. Nature will not be cheated out of her dues; or, more properly speaking, the natural laws of God, as binding in their way as his

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revealed ones, cannot be broken without the defaulter being punished by loss of health and weakening of both mind and body. Alcohol is the lowest and worst means of helping us to evade these laws. Under a show of protection, it robs us of that which no money can replace.

A number of ailments which plague both the idle and luxurious man and the sedentary student, and for the relief of which alcohol is often heedlessly and unwarrantably prescribed, are due, in many cases, to the habitual use of this liquor by the complaining parties. Some of these persons are induced to increase the quantity or change to a stronger drink, and thus innocently become, after a time, victims to inebriety. But, on the other hand, dyspepsia, depression of spirits, disturbed sleep, nervousness, weakness, irritability, headache, capricious appetite, in its being sometimes good, often wanting, rheumatic and neuralgic pains have all been, severally, either quite removed or greatly mitigated by abstinence from alcoholic drinks; and at the same time there was a marked improvement in the general health and strength, and greater ability to exercise both mind and body in the discharge of various duties required. Of the numerous attestations in proof from professional gentlemen and scholars, we present the following. The first is from the Rev. Sydney Smith, one of the founders of the Edinburgh Review, and a frequent contributor to its pages, the racy Englishman and laughing philosopher, who writes thus to his daughter, Lady Holland: "Many thanks for your kind anxiety respecting my health. I not only was never better, but never half so well; indeed I find I have been very ill all my life without knowing it. Let me state some of the good arising from abstaining from all fermented liquors: First, sweet sleep; having never known what sweet sleep was, I sleep like a baby or a plough-boy. If I wake, no needless terrors, no black visions of life, but pleasing hopes and pleasing recollections —Holland House past and to come! If I dream, it is not of lions and tigers, but of Easter dues and tithes. Secondly, I take longer walks, and make greater exertions without fatigue. My understanding is improved, and I comprehend political economy. I see better without wine and spectacles than when I used both. Only one evil comes from it: I am in such extravagant spirits that I must lose blood or look out for some one who will bore or depress me. Pray leave off wine—the stomach is quite at rest, no heartburn, no pain, no distension." The second relator of his own case is the Rev. Samuel Miller, D. D., of Princeton. For sixteen years

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he had followed the advice of his physicians, to take a glass or two glasses of sound wine daily. "During all this time," he writes, "my health was delicate. More than six years ago, when approaching my sixtieth year, I broke off at once. The experiment had not proceeded more than a month before I became satisfied that my abstinence was very strikingly beneficial. My appetite was now more uniform, my digestion much improved, my strength increased, my sleep more comfortable, and *all my mental exercises were more clear, pleasant, and successful.*" Of the same nature is the personal experience of the late eminent Professor Silliman, of Yale College. After several years of failing health, notwithstanding the use of the most approved stimulants and the most nutritious and varied diet, he was induced to abandon the use of wine and every alcoholic stimulus, and to substitute a plain diet composed chiefly of vegetables and milk, with very little flesh meat. The result was, at the end of a year an ability to resume all his arduous duties with constant exertion of both body and mind. Dr. Cheyne, Physician-General to the Army in Ireland, an eminent practitioner in Dublin, and a strenuous advocate of temperance and temperance societies, gives the following case in his second letter, written more than thirty years ago, on the effects of wine and spirits. "Nearly three months ago, a gentleman far advanced in years, came to Dublin to obtain relief from a painful affection of the biliary ducts, under which he had been suffering for nearly a year. He considered himself to be temperate in wine, of which, I believe, he seldom exceeded a pint after dinner. Before he left the country he was ordered to take not more than three or four glasses of wine in the course of the day. This gentleman came under my care, and shortly after had an attack of the palsy, one side of his body becoming nearly insensible and powerless. I took the opportunity of withdrawing from him every description of fermented liquor, limiting him to aqueous drinks. Under this regimen, to which, being a man of strong resolution, he cheerfully submitted, in four or five weeks, he nearly recovered the use of his paralyzed limbs, and, what was not to be expected at his advanced age, he recovered flesh."

Immediate Abstinence from Alcohol Safe.—Another cruel and pernicious fallacy in relation to the disuse of alcohol is, that this ought to be gradual, and that there is danger from a sudden cessation in drinking intoxicating liquors, especially in cases of confirmed drunkenness. Acting on this fear, the advice often given to the

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unfortunate victim of intemperance is, that he should leave off gradually, by diminishing the quantity of liquor from day to day; but, unfortunately, the reform is so slow, and so interfered with by fresh temptations, as often never to be completed, and there is continual risk of the inebriate, with his system still poisoned by alcohol, and his strongly acquired vicious appetite, falling back on his old usages, if not running into some wild excess. The anticipated danger from an immediate withdrawal of every kind of intoxicating liquor is utterly groundless, as we know now by a large array of facts bearing directly on the question. The most besotted drunkards, on being sent to prison and deprived at once of their alcoholic drinks, for the most part distilled spirits, have not suffered in their health in consequence; but, on the contrary, their health and appearance have been much improved. For a few days they are uneasy and indifferent to persons and things around them, and their appetite is poor; but, after this, they eat heartily and gain in the manner just mentioned. How much easier must it be in ordinary life for the sufferer, who is in his own house, and can pursue a suitable regimen, and take air and moderate exercise, to make, at once, the desired change in his drinking habits. Most of the paupers sent to our county almshouses have been reduced to indigence by intemperance. Many are admitted with worn-out constitutions, bloated bodies, swollen limbs, and other disgusting effects of drunkenness—there appears to be but one step between them and the grave; but yet, although deprived from the moment of their admission of all intoxicating drinks, they soon rally and their bodies seem to be quite renovated under this new and improved regimen. Webb, the noted pedestrian, who was remarkable for vigor of body and mind, used water alone for his drink. He was recommending, one day, his regimen to a friend, and urged him with great earnestness to quit a course of living, by which his health and his intellect would be equally destroyed. The gentleman appeared convinced, and told him that he would conform to his counsel, but thought he could not change his course of life at once, and he would leave strong liquors by degrees. "By degrees!" said Webb, with indignation; "if you should fall in the fire, would you tell your servant to pull you out by degrees?"

Social Pleasures marred by Alcohol.—The social principle is said to be more genial and expansive under the exhilarating operation of alcohol; but under this incentive the line of true exhilaration is soon reached and easily passed, and the excitement is apt to abate

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with the first feelings and pledges of good fellowship and mutual regard, and soon be lost in a confused perception of what is really going on. Self-control is weakened, and mistrusts and jealousies, which had been long dormant, are revived, and show themselves in a tone of petulance at first, and then of anger, increasing with every round of the bottle, until men who, at the beginning of the symposium had grasped each other's hand with cordiality and smiles, find themselves, at its end, indulging in bitter interjections of dislike and hatred, and ready to engage in bodily strife, to the extent of the shedding of blood and the taking of life itself. No such doubtful and treacherous help as alcohol is required to increase the activity of the social principle; it expands under other and safer and more abiding influences, and if exhilarating beverages are required, they will be found in tea and coffee. On this point your reporter can speak from personal experience. He was associated with seven of his medical brethren in a club which used to meet, once a week, at the house of one of its members in succession. It was agreed, in advance, that there should be no other beverage, after water, than tea and coffee; and no other solid than a few slices of bread and butter and light cakes. The meetings were continued for more than thirty years, and the members of the club, and the few friends invited to join them, could all bear the same testimony to the pleasant, genial spirit, the ready joke and repartee and laugh, intermingled sometimes with occasional remarks on the topics of the day, which abounded on those occasions. There was sure to be the cordial bidding good night, and on the following morning exemption from headaches, and all unpleasant feelings and reminiscences.

Holidays intended, and wisely too, for recreation and pleasure, and for allowing opportunities for relaxation from work, and for social enjoyment, are too often commemorative of scenes of disorder and turmoil, under the mischievous belief that alcoholic liquors must be drunk at such times with more than usual freedom, as a means of increasing the pleasures of the day. Physicians are apprised, on the following morning, by an addition to their sick list, of the nature of the rejoicings of many deluded persons, for which they are thus doing penance. Magistrates are called upon to rebuke and punish infractors of the peace, "marrers of the general joy;" men who would have conducted themselves as quiet and well-behaved citizens, but for their having poisoned their brains by alcoholic drinking.

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It is to be feared that in many parts of this country the same language might be held as that used by the Rev. Augustus Wm. Hare, Rector of Alton Barnes, England, in one of a series of practical sermons addressed to a plain country congregation: "I verily believe," said this good man, "that there is more drunkenness, more rioting, more wickedness of all kinds going on at these three holy seasons of Christmas, Easter, and Whitsuntide, than on any other three weeks of the year." Our great national holiday of the fourth of July is probably the most abused, we might say, desecrated of all. Now, with a knowledge of these facts, ought those persons to be considered as ascetics and opposed to the people and especially to the youth of our country enjoying themselves on all anniversaries and festive occasions, if they were to recommend entire abstinence from all intoxicating drink by the parties participating in these rejoicings? Would not the sleep after a day thus spent be more sound and refreshing, and the waking in the morning more cheerful, and bring with it more alacrity to resume regular labor or business, than if alcohol had been freely used?

ETIOLOGY.

Alcohol as a Cause of Disease.—With a knowledge of the long list of diseases caused or aggravated beyond recovery by the use of alcohol as a drink, it must seem a mockery to call it a food or a substitute for food. Excuses are made for alcohol by our being told that any article of ordinary food may, if eaten in excess, be a cause of sickness, and that it is not more logical to condemn alcohol for its deleterious effects when taken in excess than it would be to forbid the use of mutton-chop or beef-steak, because men have gorged themselves with these meats and died in consequence. But there is no analogy in the two cases. Meat is a highly nutritive food; it furnishes large material for making blood; and is in no sense a poison. Alcohol is not a nutritive food, it contributes nothing towards the formation of blood, and is in its nature always a poison. If a person commits an excess in eating meat, and suffers in consequence, he will be more cautious for the future, and eat less, but still know all the while that he is increasing his tissues and gaining material to keep up his health and strength. A drinker of alcohol is seldom admonished by his excesses, but continues on in increasing quantity, or even if he lessens this he is

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still alcoholized, still primed for an explosion of disease. Gluttony is a vice, but its being indulged in by one man furnishes no excuse or apology for another man becoming a drunkard. Relief is sometimes sought by the glutton in alcohol to relieve his overloaded stomach or to quicken a palled appetite, but the result is disastrous. "A glutton," says Darwin, "may be crammed up to the throat, and fed like a stalled ox, but he will not be diseased, unless he adds spirits or fermented liquor to his food. This is well known in the distilleries, where the swine, which are fattened by the spirituous sediments of barrels, acquire diseased livers." The tendency of the general use of animal flesh is to keep up the health and augment the bodily strength of the individual, and to increase population. The tendency of the general use of alcohol is to impair health and bodily vigor, and to diminish population.

Whatever causes tend to impoverish and demoralize a people, contribute, at the same time in so doing, towards diminishing the public health and increasing disease. On this account, statistical returns, which would seem, at first sight, only to interest governments and political economists, have real importance in the eyes of medical men. What a startling announcement is that made in our daily papers, viz., that the sales of retail liquor-dealers in the United States during one year amounted, according to the report of Commissioner Wells, to $1,483,491,865! Of this sum, New York is credited with $246,617,520; Pennsylvania, $152,603,495; Ohio, $151,734,875; and Illinois, $119,033,945. When to this enormous amount of nearly fifteen hundred millions of dollars is added the value of the time wasted in the consumption of ardent spirits, and of the property destroyed by intoxicated persons, we can readily credit the assertion that the savings, from the disuse of alcoholic drinks, would extinguish the public debt in one year. Another estimate, at reduced figures, is that the people of the United States expend enough annually for liquor to more than half pay the debt. Even if we assume this last estimate to be correct, what a fearful interference is caused by alcohol with national economy and progress! But, on the ground of humanity, the most important items have been left out, viz., the diseases caused by drinking alcohol, and the loss of time on the part of those laid up from this cause. It is estimated that in Great Britain the annual consumption of intoxicating liquors is 1,025,000,000 gallons, upon which there is a tax of $120,000,000 a year to the country. During the five years ending September, 1867, there were

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nearly 1,000,000 cases of assaults and drunken and disorderly conduct summarily disposed of before the magistrates in England. The annual average of these cases was 193,640. Again, the total value of intoxicating liquors consumed by the people of Great Britain in 1865 was $443,098,380. This sum exceeds by many millions the gross expenditures of the United Kingdom in 1865. A recent calculation shows that on a Saturday evening in London there is one intoxicated person for every eight persons who are sober. In Scotland, the people who pay taxes for the support of the poor have had a reminder of the increase of intemperance in that country in the fact that within thirty years the cost of pauperism has increased from $950,000 to $4,250,000. The prolific cause is intemperance. We might multiply statements of this nature, such as all civilized countries, more particularly those of Northern and Middle Europe, and the United States—every city, town, and county in the latter—would furnish. The same melancholy story is told in all of them—poverty, insanity, and crime to the individuals; enormous expenditure, nearly all of it preventable, by the government.

Alcohol Shortens Life.—The first charge under the present head which we bring against alcohol is that its use shortens life. It appears from the tables of Mr. Neison, Actuary of the Medical Invalid and General Life Insurance Company of London, that, on an average of the different periods of life from 15 to 90, there are 32 deaths of the intemperate to every 10 of other persons. Thus, between the ages of 15 and 20, of the intemperate 18 and of others 10 persons die; between 20 and 30, of intemperate 51, of others 10; between 30 and 40, of intemperate 42, and 10 of others; between 40 and 50, of intemperate 41 to 10 of temperate; between 50 and 60, of intemperate 29 to 10 of others; between 60 and 70, of intemperate 19 to 10; between 70 and 80, of intemperate 20 to 10. These estimates do not include moderate drinkers, but those only who were "decidedly addicted to drinking habits." The total also of other deaths is taken from the whole population; so that, in fact, the disparity is greater than it appears. If we look at the rates of mortality from the points of view of equation of life, we find that at the age of 20 the general population had an equal chance of living 44 years, while the intemperate have the chance of living but 15½ years. In other words, they have but 35 per cent. of the chances of living. We learn from another source that the annual mortality in the Temperance Provident Society of

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London, during seven years, averaged only 4 in 1000. In agricultural laborers in the prime of life, the more highly favored of the working classes, it is 8 per 1000. Among healthy persons generally it is 10 per 1000. Among clerks, at the same age, it is no less than 22 per 1000. "The Teetotal Society" in Preston, England, presented some years ago, as we learn from the report of the Rev. Mr. Clay, not merely the smallest proportion of sick, but it also suffered the shortest average duration of sickness. We meet every now and then, however, with instances of longevity among notorious drunkards, whose constitutions seem to be proof against alcohol-poisoning, as some of the peasants of Styria are against the regular use of large doses of arsenic. These old drunkards have been aptly called "the devil's decoys," as encouraging younger persons with less tenacity of life to imitate them; but they are exceptional, and do not help the average which is against the intemperate as a class. Dr. Cheyne affirms that, "should ten young men at twenty-one years of age use but one glass [of ardent spirits] of two ounces a day, and *never increase the quantity*, nine out of ten would shorten life more than ten years."

Organic Lesions caused by Alcohol.—The same causes which shorten life by weakening the springs of action predispose the intemperate to the attacks of disease, especially of an epidemic or malignant character, whether it be influenza, cholera, yellow fever, or smallpox. This predisposition shows itself also in a readiness to contract almost any other disease, especially where there exists an hereditary tendency to their occurrence, as in gout, epilepsy, insanity, and consumption. The special brain disease of drunkards, *delirium tremens*, is often brought on by a debauch or very slight increase of alcoholic drinking, and also by some special irritation of the nervous system, as by a fractured limb, etc. The cumulative effects of prolonged imbibition of alcohol have been clearly proved by the experiments of Dr. Ogston.

Alcohol acts on the *stomach* by causing a chronic catarrhal condition, increase of connective tissue between the glands, degeneration of their contents, and more or less atrophy or disappearance of the parts. Taking another view, when spirituous liquors are introduced into the stomach, they tend to coagulate, in the first instance, all albuminous articles of food or fluids with which they are brought in contact; as an irritant, they stimulate the glandular secretions from the mucous membrane, and ultimately cause permanent congestion of the vessels and spurious melancholic deposits.

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The coagulation of food by alcohol is very different from that produced by gastric fluids, and tends to render it more difficult of solution by the gastric juice or by pepsin. Chronic vomiting acknowledges alcohol as one of its causes. On its first entering into the circulation after absorption by the stomach, alcohol finds its way through the vessels of the portal system and permeates all the tissues of the liver. But the nervous centres are the greatest sufferers; the morbid changes within the skull amounting to 92 per cent. of those examined, as we learn from Dr. Ogston, who made an autopsy of 117 drunkards. The prolonged action of alcoholic poison on the brain produces induration of the cerebral and cerebellar substances in by far the larger number of cases, coincident with an increased amount of subarachnoid serum, while the steatomatous degeneration of the small arteries leads to atrophy of the convolutions and œdema of the brain. Dr. Aitken[1] tells of the case of a person who for many years had been in the habit of drinking daily a large quantity of brandy. He died of typhoid asthenia, with characteristic degeneration of nearly every important organ of the body and of the bloodvessels. The fluid collected from the cavities of the brain, consisting of the serum and some blood, contained 2.6 per cent. by volume and 2.1 per cent. of alcohol. Dr. Samuel Lewis, of Philadelphia, when house-surgeon in the hospital at Edinburgh, made a careful autopsy of a man who had been a vagrant, and habitually indulged in strong drinks. Dr. L., following the process laid down by Ogston, detected alcohol in the brain. Dr. R. D. Mussey, in his brief report to the Association, on the "Effects of Alcoholic Liquor in Health and Disease" (Vol. III. of *Transactions*), quotes Dr. J. C. Hanson, who bled a man that had been drinking for three or four days, and who detected in the blood thus drawn alcohol in the form of a halitus which burned for thirty seconds with a blue flame, on the application of a lighted taper. Ogston found alcohol in the brain of sufficient strength to burn upon a light being applied.

The changes in the respiratory organs succeed in frequency those of the nervous centres, being in the proportion of 63.24 per cent. As already stated, alcohol ingested in any quantity, however small, lessens the amount of carbonic acid in the air of respiration; habitually taken in larger quantities, it alters the molecular constitution of the lungs, as chronic bronchitis and lobar emphysema

[1] Science and Practice of Medicine, Medical Examiner, vol. i.

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are certainly more common in those who take much alcohol. Dr. Craigie says that all the spirit-drinkers whom he has ever seen have been either subject to chronic cough or have labored under chronic bronchial disorder with asthma. Alcohol acts on the *liver* by producing enlargement of the organ and an albuminoid and fatty deposit, or it causes at once increase of connective tissue, with *cirrhosis*, or the waxy liver of French, the hob-nailed liver of English writers, by both of whom it has been carefully described, and attributed to the same cause. Finally, there is contraction of Glisson's capsule, and atrophy of the portal canals and cells, by the pressure of shrinking exudation. The fatty liver is often met with in persons who lead an indolent life and are at the same time gross feeders, "eating largely of fatty substances, and drinking freely of spirits, but more especially of porter and other heavy malt liquors." If, says Dr. Bence Jones, the different organs and textures of the body were arranged in a series according to the different amount of fat-producing or fat-depositing action that takes place in each, the liver would occupy the highest place and the lungs the lowest. It must be remembered, however, that the waxy, sometimes confounded with the fatty liver, is common in phthisis, and is seen in cases of great constitutional disturbance and exhaustion connected with cancerous ulceration and abundant suppuration. The liver in a state of fatty degeneration would seem to grow at the expense of the fat of the body, as is the case in the geese which are largely fed, deprived of exercise, kept in a dark place, and so treated that the only growing organ is their large liver, which goes to make the celebrated *patés de foie gras*. Chemical theory might suggest, *à priori*, that alcohol in the hepatic vessels would be decomposed and its carbon be eliminated in the bile, of which this element forms so large a part; but experiment and observation teach the very reverse, and that, so far from there being an increased quantity of bile, and consequently of carbon, discharged from the liver of alcoholic drinkers, this secretion is diminished. The morbid changes in the liver amounted to 56.4 per cent. The *heart*, under the free and habitual use of alcohol, becomes altered in its molecular constitution, and there is not only a tendency to the deposit of fat on its external surface, but it undergoes a real fatty degeneration in its substance by the deposit of fat in the interstices of its muscular fibres, and displacement and diminution of these latter. This organ also undergoes hypertrophy, dilatation, pericardial adhesion or thickening, and valvular disease.

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Its percentage, including the aorta and pulmonary artery, was 47.86. The kidneys, under alcoholic influence, fail to eliminate the usual quantity of urea and of water; the amount of phosphates is diminished, and of the sulphates increased. They are altered by hypertrophy, congestion, and fatty degeneration in the proportion of 41 per cent. Setting aside tea and coffee, our stimulants are, writes Dr. Bence Jones, essentially alcoholic, and it is the long-continued strong chemical action of alcohol on oxygen and on the different textures of the temperature of ninety-eight degrees that gives rise so frequently to that increased motion and increased thickening, followed by contraction and suboxidation, which constitutes cirrhosis of the liver and kidney. "The increased oxidation, the increased flow of blood, the altered nutrition, are identical in kind with the first actions of inflammation; and when the series of actions are repeated over and over again for years, the result is the same as might have been produced in a shorter time by an ordinary inflammation, when no alcohol whatever had been taken." No doubt the alcohol acts on the vessels and ducts of the kidney, but not so powerfully as on the interstitial texture, the change in which, thus produced, gives "interstitial nephritis." The insidious progress of disease from alcohol, and the apparent impunity with which in some cases it is taken into the system, are indicated in the preceding extract, and ought to give warning, not so much against the coming danger, as against any exposure to it at all. The writer just quoted says: "With regard to treatment, medicine avails little for stopping the effect of alcohol poison, or for removing the thickening of the interstitial structure. No appreciable alteration of structure occurs *until the alcohol has acted for months;* but as each day produces its infinitesimal effect, some good may be done by recognizing the disease early, and by stopping, as far as possible, the further action of the poison. Usually the second nature cannot be changed, and the treatment consists then only in alleviating symptoms and in warding off complications as they arise." Dr. Jones describes interstitial nephritis in connection with or as a complication of Bright's disease. A correct diagnosis and knowledge of cause are the more important, as, of all the symptoms, general debility is the one which most frequently presents itself, and for the relief of which there would be a strong temptation to have recourse to alcoholic drinks, either distilled or fermented. Christison has been already quoted in this report, as stating that three-fourths of all the cases of Bright's disease which he saw were

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produced by the habitual abuse of alcoholic drinks. Dropsy is a common attendant on organic lesions of the heart, liver, or kidneys, and is for the most part to be regarded as symptomatic of disease of one or other of these organs. Albuminuria affords a ready example of this connection in the case of the kidneys. Ascites, as resulting from fatty degeneration of the liver, is thus explained by Dr. Chambers: "The constant presence of alcohol in the blood obstructs the necessary renewal of the fibrous capsule of the liver; contraction of the degenerated tissue ensues, the portal blood cannot pass through the viscus, to get rid of its effete particles or to bear the nutriment to the general circulation; the natural halitus of the peritoneal sac cannot be reabsorbed, and therefore accumulates, to form an ascitic (or, as the Greek word means, an 'ensacked') collection of serum. With this fluid is mixed, also, the albuminous serum and fibrous serum which exudes from the obstructed capillaries, and often these capillaries rupture, and blood-corpuscles are found in the dropsical fluid."

In the *bloodvessels*, alcohol causes general turgescence, and especially of the skin, and ready tendency to congestion. The amount of fat is increased in the blood, or it is more visible, under alcoholic drinking. Fat increases in the blood in most acute diseases when the biliary secretion is retarded, and when a scanty amount of food is taken. These are the very conditions which obtain in alcoholism. Oil is found in the blood and urine, and a milky appearance is imparted to the serum of the blood of drunkards. The white and fatty blood of Frank originates in the use of alcoholic drinks. An analysis of the blood of two patients with *delirium tremens*, made by Mr. W. J. Cox (*Sanit. Rev.*), showed that this fluid was in both instances attenuated and deficient in plastic material; and contained a great excess, or from six to eight times more than common, of fatty matters. Lecanu found in one case of a sot the still higher proportion of one hundred and seventeen parts in a thousand. The blood, in addition to the fatty matter which it holds, is also surcharged with unchanged and unused or unmetamorphosed material, and contains about thirty per cent. more of carbon than in the normal state. How poorly is this nutrimental fluid enabled, under these circumstances, to supply the tissues; or if anything is sent, it is fatty or oily matter with which the organs become infiltrated. Impaired health must soon follow by the retention of carbon and urea, oxalic acid, etc.; a retention, be it remembered, of substances which ought to be eliminated. So long as alcohol remains

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in the blood as alcohol, a certain toxic or poisonous effect continues to be produced upon the nervous system through which this corrupt blood circulates; and if a constant supply of the alcohol is kept up, the phenomena of alcoholism, chronic or persistent, and acute paroxysms generally, in the form of *delirium tremens*, supervene, which is at once the most common and the most prominent evidence of *alcoholism*. In other instances, the degeneration of several vital organs may become so excessive that death follows by asthenia, or by typhoid phenomena ending in coma. Congestion in the mucous membranes of the lungs and stomach is evidence of retarded motion of the blood. Hæmorrhoidal swellings are always aggravated by the use of alcoholic fluids.[1] Among the morbid effects of alcohol on the liver should have been mentioned the formation of sugar, or rather of glucose, the material out of which sugar is generated in this organ. This process may go on to the extent of producing diabetes mellitus.

Dr. Rush, in his tract so often quoted by us (*Inquiries, etc.*), enumerates the following diseases as the result of the drinking of spirituous liquors, viz: 1. A sickness of the stomach and vomiting in the morning; 2. A universal dropsy; 3. Obstructions of the liver; 4. Madness; 5. Palsy; and 6. Apoplexy. Alcohol is an occasional cause of chronic vomiting. One woman had acquired the habit of dram drinking only the preceding year, while staying with some friends in Scotland at their shooling, where a nip of whiskey was the regular preparation for breakfast. The words of lament of Dr. Chambers which follow, have unhappily an equally strong application to many of our medical friends in the U. States: "But dram drinking is by no means confined to uneducated persons; those whose 'talk is of bullocks,' or to idle women. I am ashamed to say that I have been consulted about its consequences by several members of our profession who ought to know better and set a better example. *Quis custodet ipsos custodies.*" To these should be added, as the effects of alcoholics in general, albuminuria, rheumatism, gout, epilepsy, and certain skin diseases. Intemperance is the most usual predisposing cause of albuminuria or Bright's disease, as exposure to cold or to cold and moisture, is the most commonly exciting one. Dr. Bright remarks: "Where intemperance has laid the foundation, the mischief will generally be so deeply rooted before the discovery is made, that even could we remove

[1] Aitken, *op. cit.*

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the exciting cause, little could be hoped from remedies; but at the same time, a more impressive warning against the intemperate use of ardent spirits cannot be derived from any other form of disease with which we are acquainted; since, most assuredly, by no other remedy do so many individuals fall victims to the vice." The words of warning do not carry with them the needed force here, as they are directed against what the writer calls "the intemperate use of ardent spirits," instead of saying the use or habitual use; for one may very pertinently ask, what is the line between the temperate and intemperate use? Every drunkard begins with the temperate use of alcohol, and in doing so puts himself on the road to intemperance, with all its consequences. A man may, as we have previously shown, destroy his health, and become the victim of incurable disease, by continued small drinking of alcoholic liquors, without his ever having been drunk or subjected himself to the imputation of intemperance. What plea of necessity, what promise of pleasure are there, to make a man encounter such alarming dangers and positive sufferings? He begins to drink alcohol moderately, temperately, as he believes, and without meaning it drinks, for a longer or shorter time, immoderately and intemperately, and he gets an incurable disease of the liver or kidney, and dropsy and all kinds of complicated disorders, which end in death. Was this sacrifice of self made for the sake of advancement in the world, the acquisition of wealth and honors, the benefit of his family, his friends, or his country? Would he, in fine, be less of a free agent under a pledge of total abstinence, than under the dominion of an invincible habit?

Diseases caused by Fermented Liquors.—Under the head of "Hygiene," some observations were made on wine drinking as a cause of disease. Distinctions have been attempted to be drawn between different kinds of liquors, in regard to their effects on the human organism, and it is quite common to find writers and consumers who, for instance, are ready enough to give up to reprobation the use of ardent spirits, while, at the same time, they insist most strongly on the blamelessness and often salutary effects of fermented liquors—wine, beer, and cider. We have touched on this point when speaking of the different kinds of intoxicating drinks under the head of hygiene. Examined in its relation to disease, the distinction will not hold. Alcohol may be variously disguised, but in all its forms and combinations it is still alcohol, with its constant property of producing intoxication and other disorders of body and mind. If

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the diseases from excess in wine drinking be less violent and acute than those from ardent spirits, they are in greater number and more complicated from the first than from the latter cause. The drinker of ardent spirit, if he survive the first shock given to his constitution, may sometimes, though rarely, attain old age, and in the tolerable enjoyment of his faculties. The tippler in wine subjects himself to such a complication of diseases that he sinks earlier under them. If he survive for any long term of years, his life can only be called a long disease—showing itself at different times as gout, rheumatism, cerebral disorders, gravel, and painful eruptions and boils on the skin. The lovers of the bottle, says Beddoes, flatter themselves that care in selecting wines will exempt them from evils which they cannot dissemble from themselves wine produces. But the distinction, he is afraid, rests upon a difference little in point as to health. "It is the result of common observation," he continues to remark, "confirmed by unvarying medical experience, that among country gentlemen, citizens, the frequenters of the common and combination room, the associates of the mess, the farmer, the merchant's clerks, and the artisans that crowd the smokeshops in places like Birmingham, a large proportion injure their digestive organs, whatever may be the purity or adulteration of liquors, provided they be of the same strength, and taken with nearly equal freedom." The following case is full of instruction, as showing the promptness with which remote parts will sometimes respond to disturbance in the stomach, produced by a fermented liquor. It is related by Mr. Crampton, Surgeon-General of Ireland, and published in the *Dublin Hospital Reports:* A gentleman of a fair complexion and rather delicate frame, who labored under a severe pain of a periodic nature, which depended upon an inflammation of the periosteum of the right tibia, noticed a circumstance with respect to the influence of fermented liquors in this affection, which, says Mr. Crampton, appears to be of considerable importance, as illustrative of the effects of even very small quantities of alcohol in diseases of an inflammatory nature. The patient observed, at first, that the pain invariably recurred within an hour after dinner, at whatever hour he might have taken that meal, and whether the food had been animal or vegetable. Suspecting that this might be connected with the nature of the liquid, rather than the solid matter which he took into his stomach, he left off fermented liquors. On the first day after he made the change, the pain did not return till he had been an hour in bed; and this led him to institute a

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number of experiments upon the influence of the different kinds of fermented liquors in different quantities. The result was that the pain could, with certainty, be excited within an hour by drinking a glass of any kind of fermented liquor, however weak; and a single drachm, by measure, of port wine, diluted with four ounces of water, acted with equal energy as a glass of undiluted wine. Sir Anthony Carlisle tells of a gentleman of a gouty habit who, before he had done drinking his claret at dinner, felt twinges of pain in the great toe of one of his feet. Dr. Cheyne remarks, as a commentary on Mr. Crampton's case, that "in a numerous class of protracted disorders, hence called chronic, in which some viscus continues long in a state of inflammation, before it is disorganized, a very small portion of alcohol will often feed the inflammation, and hence, in such diseases, the most important part of regimen, as will be acknowledged by every physician of experience, consists in an entire disuse of distilled or fermented liquors."

It is a common if not a professional opinion that the *gout* is as frequently owing to gluttony in eating as to intemperance in drinking fermented or spirituous liquors. To this Dr. Darwin replies, that he has seen no person afflicted with gout who has not drunk freely of fermented liquor, as wine and water, or small beer. Dr. Wood, in the like sentiment, makes the remark that the abuse of wines and malt liquors is more apt to cause gout than that of ardent spirits.[1] In a person with the gouty diathesis, one may fear that any use of those liquors is an abuse, inasmuch as he will be in danger of an attack by taking the smallest quantity of them. And then again, whoever should put himself on a prophylactic regimen, to prevent the recurrence of gout, could scarcely include in this fermented liquors, any more than condiments and rich sauces. Dr. Garod, in his valuable work on Gout and Rheumatic Gout, tells us very explicitly: "There is no truth better established than that the use of fermented liquors is the most powerful of all the predisposing causes of gout; nay, so potent that it may be a question whether the malady would ever have been known to mankind, had such beverages not been indulged in. Distilled spirits, taken exclusively, appear to exert little or no power in inducing gout, whereas with wines, strong ales, and porter, the reverse holds good." The author takes care, however, not to be misunderstood on this point, for he says, it must not for a minute be supposed that spirits

[1] Therapeutics and Pharmacology, vol. i. p. 645.

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are less pernicious to the system than wine. On the contrary, the occurrence of granular kidney and dropsy is exceedingly common among populations where large amounts of distilled spirits are imbibed. Van Swieten says that gout was little known in Holland until wine was introduced as a substitute for beer. Linnæus was inclined to regard wine as almost the sole producer of gout, seeing that the Laplanders partook plentifully of malt liquors without so much as dreaming of such a disease. But this exemption from gout when drinking malt liquors is enjoyed by those only who use the weaker kinds. The effects of large draughts, daily, of strong porter are well shown by Dr. William Budd, in his account of the great indulgences in this way of a body of men employed to raise ballast from the bottom of the Thames, and who are under much exposure to inclemency of weather; their occupation requires great bodily exertion, occasioning profuse sweating and much exhaustion. Their allowance of liquor is very large; each man drinks from two to three gallons of porter daily, and generally a considerable quantity besides. Although not a numerous body, many of these ballasters are yearly admitted to the Seaman's Hospital Ship, affected with gout. The fact is otherwise interesting, as it seems to show that no amount of bodily exertion is adequate to counteract the influence of such large doses of porter. Dr. Garod's own experience of the relative power of alcoholic liquors in inducing gout is, that port, sherry, and other stronger varieties are the most potent in their operation. The lighter wines, as claret, hock, moselle, and even champagne, although capable of acting as the exciting cause of an attack in gouty subjects, have, when taken in moderation, but comparatively little inducing power, and probably in this respect rank with the weaker kinds of malt liquors. The exemption, in a good measure, of the wine drinking population of France and Rhenish Germany is due not only to their using weaker vinous liquors, but, also, to their simple living in other respects, and the relatively small amount of animal food which they consume. The same explanation will apply to the agricultural population of England in their use of the weaker kinds of malt liquors. In some of the large cities of France and Germany, gout is common; there the finer qualities of wine are taken, together with larger quantities of animal food. Stout and porter were found by Dr. Garod to rank next to wine in predisposing to gout, as is seen in the cases of the men connected with the great London breweries, and who not unfrequently drink an

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almost fabulous quantity of malt liquors. In Bavaria and Berlin, where a large amount of beer is taken, gout also prevails. Cider and similar beverages will also act to some extent in predisposing to attacks of gout. Certain wines, such as champagne, even to the amount of only a single glass, are among the most common *exciting* causes of gout. Beer and cider sometimes act in the same way. Gouty pains in the limbs have been felt before leaving the dinner table, from partaking of champagne wine.

In the last century, when wine was proportionately more used, and at the same time more pure in England than it is at the present day, all the diseases attributed to strong drinks were freely referred to this liquor as a cause, and surnames were given to those who drank much of a particular kind, as we find in Sir John Floyer's work on the Cold Bath, in which he speaks of the (diseased) livers of most *Clareteers*. The witty author of Hudibras, in the century preceding, in his satire on drunkenness, speaks throughout of wine as the aliment to this vice. He concludes in the following quaint but expressive lines:—

"So Noah, when he anchored safe on
The mountain's top, his lofty haven,
And all the passengers he bore,
Were on the new world set ashore,
He made it next his chief design
To plant and propagate a *vine*,
Which since has overwhelm'd and drown'd
Far greater numbers on dry ground
Of wretched mankind, one by one,
Than all the Flood before had done."

Nowhere can be found more emphatic warning against indulgence in wine than in the "Proverbs" of Solomon, the wisest of men. Who, he asks (chapter xxiii. 29, 30), hath woe, sorrow, contentions, babbling, wounds without cause, redness of the eyes? "They that tarry long at the wine; they that go to seek mixed wine." How admirably does he describe in a few words (in verses 32, 33, 34, and 35) the virulent poisoning, the imaginary company, the foolish utterances, bewilderment, insensibility, and stupor of drunkenness. The wise Preacher, himself a king, enjoins total abstinence on kings and princes. "It is not for kings, O Lemuel, it is not for kings to drink wine, nor for princes strong drink."—Chap. xxxi. 4.

In some of the returns of the causes of the disease in French asylums for the insane, we read, as already stated, "abuse of wine,"

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and in others, "abuse of strong liquors." Both men and women were the sufferers. When Juvenal lashed with all the severity of satire the drunkards and gluttons of his day, he knew of no other intoxicating drink than the fermented juice of the grape, wines variously combined and spiced, as when he speaks of

> "Hot, heavy lees, to fire the wretched guests,
> And turn them all to Corybants or beasts."

It was this liquor which gave rise to the scene that he describes when he says:—

> "At first with sneers and sarcasms you engage,
> Then deal round mutual wounds with mutual rage."

McNish[1] speaks in very decided language of the deleterious effects of malt liquors. Those addicted to their use increase enormously in bulk. They become loaded with fat; their chin gets double or triple, the eye is prominent, and the whole face bloated and stupid. Their circulation is clogged; their pulse feels like a cord and is full and laboring, but not quick. During sleep the breathing is stertorous. Everything indicates an excess of blood, and when a pound or two is taken away, immense relief is obtained. The blood in such cases is more dark and sizy than in others. In seven cases out of ten, malt liquor drunkards die of apoplexy or palsy. If they escape this hazard, swelled liver or dropsy carries them off. The abdomen seldom loses its prominence, but the lower extremities get ultimately emaciated. Profuse bleedings frequently ensue from the nose, and save life by depleting the bloodvessels of the brain. This picture is deeply shaded, but it was drawn from the life by a careful and experienced observer. The drunkenness in question, continues this writer, is peculiarly of British growth. They who would make bare endurance an evidence of benefit received, may read without fear, if not with entire approval, of the enormous quantities of malt liquor drank daily by men engaged in their work without immediate prostration, sickness, and death. "Many of the coal heavers on the Thames think nothing of drinking daily two gallons of porter, especially in the summer season, when they labor under profuse perspirations. A friend has informed me that he knew an instance of one of them having consumed eighteen pints in one day, and he states that there are many such instances."

[1] Anatomy of Drunkenness.

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In respect to the chronic effects of beer, Dr. Chambers believes that a long continued-course of excess in beer, even moderate excess, is more productive of degeneration, than excess in wine or spirits. It is with malt liquors in England as it is with wine in France, the habit of drinking them leads often to the use of distilled spirits—gin and brandy. The free use of intoxicating drinks, whether they be fermented or distilled, in our own country, is the more to be deprecated, as our climate will less admit of the inhabitants using stimulants; the air itself which they breathe, and the atmosphere in which they live being more exciting than that on the other side of the Atlantic. Climatologists may not be able to give a full explanation of the cause, but the fact is not the less undoubted: we see already the more mercurial character of our people than that of their European ancestors. We have heard intelligent gentlemen from Great Britain volunteer the observation, that they could not take, in the United States, their wine or other liquors with the same freedom that they were accustomed to at home. No one has given the respective characters of the malt and ardent spirit drunkard with greater truth than Hogarth, in his pictures "Beer Alley," and "Gin Lane." The denizens of the first are represented as plump, rubicund, and bloated; they of the second as pale, tottering, and emaciated, and dashed over with the aspect of blank despair.

Cider is, we have seen, both a predisposing and exciting cause of gout. It also, in districts in which it is largely used, gives rise to colica pictonum, or vegetable colic, and under circumstances in which no lead was present to be brought in contact with the cider. Dyspepsia and other derangements of the alimentary canal are sometimes referable to the use of this liquor. Professor Silliman, of whose experience in the use of alcohol drinks we have spoken, attributed bleeding at the nose, under which he had at different times suffered, to his drinking cider. He mentions two other cases of the disease referable to the same cause.

All Distilled Spirits Bad.—Drinkers of distilled liquors are not content to regard them as a group from which they can take, indifferently, any one that happens to be at hand and is most easily procured. They will, on the contrary, be heard discussing the respective merits, on the score of health even as well as of taste, of brandy, rum, gin, whiskey, as if the question were really an open one, on the solution of which vital interests depended. Thus, by one set, we are told that brandy, the real cognac, is distinguished

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by its cordial and stomachic properties; by another, that good old Jamaica rum with its volatile oil is wholesome and pleasant, and suggestive withal of jack-tar and jollity. A third party will expatiate on the virtues of gin, old Holland, with its fine flavor of juniper, sweet flag, etc., which makes it so good a diuretic—good in often causing inflammation of the kidney and bladder in cases of imperfect or suspended discharge of urine for which it was taken. But the patriotic American hoists the flag over a line of hogsheads of old Monongahela, the watchword a few years ago, old Bourbon at the present time, as the liquor on which to get merry with one's friends, and uproariously drunk on our great national festival of the fourth of July. There was a time, we do not know how it is now, when old Virginia used to exclaim "Psha" to both rum and whiskey, and point to her fine old peach brandy, oily with age; and then looking towards the Blue Ridge with a significant gesture, intimate that her young folks who lived on the other side of the mountain, and had got mixed up with Pennsylvania Germans and Scotch Irish, were burning their vitals with new apple brandy, in place of keeping to their primitive cider. But we can imagine the consternation among the *spiritualists* who had met in friendly council when they heard suddenly a loud voice from Germany, denouncing one of their prime favorites, and of such respectable parentage, too, as coming from the grape. Dr. Roesch, of Urach, who is by no means an advocate of total abstinence, denounces brandy for its pernicious effects both physical and moral. He says, "Whoever shall succeed in banishing brandy from use will confer an advantage equal to the discovery of vaccination." We agree with him, but to denounce brandy while approving of the use of the other distilled liquors is very much like the conduct of a swearer who has a vocabulary of oaths which he ejaculates without stint, but who denounces the utterance of a particularly strong one, which he considers infamous and a sad breach of good manners and politeness. It undoubtedly is so, but what of the rest of the vocabulary? Brandy deserves lavish censure; but if we thrust it to one side with ignominy, shall we, smilingly, invite to our table or festive board the rest of the noisy family—rum, gin, whiskey, arrack, absinthe, or their professing peace relatives, wine, beer, and cider, at the risk of being ourselves turned out of house and home, and contracting diseases of a virulent character?

Rheumatism caused by Alcohol.—Having shown the fallacy of the belief that fermented liquors should be placed in favorable con-

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trast with distilled spirits, when treating of alcohol as a prolific cause of disease in so many different forms, we continue our notice of some of the more conspicuous of these morbid changes. In speaking of cold or of cold and moisture as the common exciting cause of rheumatism, due stress is not laid on the predisposition which makes this cause effective. Careful observation will show that a great predisposing cause not noticed by many of our systematic writers on the practice of medicine is the free use of alcoholic drinks and most commonly of distilled spirits. The laboring classes are frequent sufferers from rheumatism, on account, we are told, of their greater exposure to cold and moisture in their various employments, and, also, of their being often imperfectly clad, but it should be added that these persons are, at the same time, in large numbers, drinkers of distilled spirits. So long as they indulge in this habit so long will they be liable to a recurrence of the disease, which, after a time, may assume a more chronic form. The product of the still would seem to perform nearly the same part in the production or at least ready recurrence of rheumatism that wine does in gout. But in the former as in the latter disease, other alcoholic drinks take a share in bringing on a state of predisposition as well as inviting to an attack. We are glad to be able to adduce recent testimony in favor of our opinion, long since founded in clinical experiences, of the share that alcohol often has in the production of rheumatism. Mr. Higginbottom, of Nottingham, writing to the *British Medical Journal* at the beginning of last year, lays down the following conclusions[1] on what he calls alcoholic rheumatism.

1. Alcohol rheumatism is the result of a distinct cause. 2. It is produced by drinking fermented alcoholic beverages. 3. It is slow in effecting a marked visible change in the system. 4. It does not actually appear before middle life. 5. Its effects are produced by the accumulation of the fermented alcoholic fluids taken into the system. 6. It causes stupidity, stiffness in the body, hobbling gait and ultimate lameness. 7. It causes changes of structure, producing chronic alcoholism. 8. The remedy is abstinence from the use of all fermented alcoholic drinks, and taking vigorous exercise in the open air. Valuable as these conclusions of Mr. Higginbottom are, they do not cover the entire ground, nor include the acute

[1] We borrow on this occasion from the "Half Yearly Compend of Medical Science," by Drs. Butler and Brinton. Part II., July, 1868.

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rheumatism which shows itself more frequently in early manhood and in the prime of life, and which is due in large measure to the free use of distilled spirits as its predisposing cause. As bearing on this subject, in the way of cause, prevention, and cure, we give the case of an inhabitant of Birmingham, who many years since wrote as follows: "Three years ago I was very poorly, I had the rheumatism in my back and legs, and if I drank even half a pint of my own home-brewed ale I was sure to have a headache in the morning. Once I left off drinking strong drinks, I got well of all my pains and aches. I am now in my sixty-ninth year, and never did I enjoy better health; my appetite is good, my sleep refreshes me, and I scarcely ever feel tired. All my life I have been a very moderate drinker." Another teetotaler, after referring to habits of intemperance which he acquired when a clerk in the city of Durham, England, says, that during this time he was attacked periodically with rheumatic affections of the most violent kind, bowel complaints, etc., but after he abstained from all intoxicating drinks he never experienced one moment's uneasiness, or, with the exception of cold, had a day's illness. We cite another case nearer home, and it is far from being a solitary one. A respectable and very intelligent farmer near Newtown, Pa., found himself afflicted with rheumatic complaints and sinking under the infirmities of age. Suspecting that his habits might have something to do with his infirmities, he abandoned the use of ardent spirits and simplified his diet. His rheumatic and other complaints soon left him entirely, and he felt that he had renewed his tenure of life by more than five years. In a harvest time, when he was then more than sixty years of age, he went into the field and cradled with his two full grown robust sons and a hired man, and he held his way with them all, doing as much as any of them. He drank but twice in the day, and then only water. His sons and the hired man drank repeatedly of spirits. At the date of this account, the old gentleman, then sixty-three years old, was uncommonly well and active, and his mind clear and energetic; his sight was so much improved by his change of habits that he could read newspapers and other small print without glasses. This case and that of the Birmingham man, and others of the like stamp that abound in the annals of temperance, make the best reply to the fears so often expressed and acted on, of the danger of a person in advanced life entirely and at once abandoning the use of his customary stimulants.

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Symptoms of Alcoholic Poisoning.—We gave a brief sketch of the lesions of the several organs caused by the habitual use, or, as most commonly phrased, the abuse of alcoholic liquors, without our attempting a description of the functional disorders, which would have led us into details not called for on the present occasion. A few words, however, on the symptoms of alcoholic poisoning in the confirmed drinker, will be in place, as connected with imperfect nutrition, and a break-down of the system. These are irregular appetite and digestion, irritable state of the alimentary canal, heartburn, squeamishness, vomiting, palpitation of the heart, constipation, deficient secretion of bile. With retarded circulation, but the action of the heart temporarily increased, there is congestion of the capillary vessels of the lungs, and a short tickling cough. The morbid results of prolonged alcoholization are of a double nature; partly chemical, and partly physiological or real. The general nutrition of the body suffers, and a bad state of health is at last induced, of a particular kind, which is sometimes described as the *drunkard's cachexia*, or "*dyscrasia.*" That there should be marked symptoms of great disorder of the nervous system in drunkards is what must ensue as a consequence of the frequency of the lesions of the nervous centres and their meninges, as previously stated. Hence, the diminished innervation in the morning, and exhaustion after the excitement of the evening previous; tremors of the hands, feeble and uncertain gait, which are in degree removed by taking breakfast, and in a more prompt but deleterious way by a morning dram, sometimes of the raw liquor, oftener disguised in the form of bitters, mint sling, etc., putting the blood early in a ferment, and the nervous system in an irritable condition, and increasing the morbid appetite, which finds further gratification in an alcoholic drink at midday, if not sooner. The fickleness, and moroseness, and muscular weakness of the morning have now yielded to a show of cheerfulness, and greater freedom of movement. The dinner hour comes, and food of a substantial nature is partaken of, and material is furnished for adding to the blood, and enabling the system to bear up under the alcoholic poisoning which is renewed at this time by free potations of liquor, varying in strength and quality, according to the circumstances of the tippler, or the wealth and dietetic tendencies of his host or companions. He is now "high up," boisterously merry, or captious and quarrelsome, according to his temperament; but he is almost as annoying when he attempts to be agreeable, with his maudlin talk, extrava-

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gant promises—never meant to be fulfilled—and affected sentimentality, as when he is purposely offensive by rude speech and threats of violence. Night comes and finds him somewhat calmed, but still restless and excitable, and eager to renew at supper the alcoholic indulgences of dinner, with the addition of song, jest, and ribaldry, until, overcome by liquor, he is taken helplessly to his bed, or if he be a visitor, is helped by some of his companions, not quite so far gone as himself, or by a sober servant, to his own home. Such is the daily course of a genteel drunkard, one who in all other matters may be found to affect great regard for the proprieties of life. There are others, again, who would not for any consideration expose themselves to public observation of their infirmity, and who deprecate excess in drinking. They are content to take their bitters in the morning, to strengthen their stomach, and help it, as they suppose, to digest their breakfast; they take a glass of wine or of brandy and water at noon to help them along in getting through their work, whatever it may be; and they must have a glass or two at dinner as an aid to digestion, and to prevent heartburn, or to correct acidity, and what not. If they meet with friends in the afternoon they do not object to a glass and a cigar, and when night comes they treat themselves just before going to bed to another glass, perhaps a little stiffer with brandy or whiskey than in the day, in order to make them sleep sound, and prevent cramps or deaden some rheumatic or other pain. In fine, they lie down quite boozy, and passably stupid, and awake in the morning ready to repeat the same course of moderate drinking and a show of sobriety to the outer world. But in time they are overtaken by infirmities of different kinds, for the poisoned organism cannot wear the mask of hypocrisy, and it gets disease of the liver, or becomes dropsical, or falls into palsy, to the great wonderment of the man's friends and acquaintances, who always considered him to be steady and sober, and who have often heard him say that he was never drunk in his life. It must, of course, be a vile slander to say that this man was broken down and destroyed by intemperance? Was he not even one of the prayerful?

Chronic Alcoholism.—The state of prolonged or chronic poisoning from the habitual and inordinate use of alcohol has been designated by Huss *chronic alcoholism*, which is not to be measured by the lesions of any particular organ or apparatus, although its chief seat is in the nervous system. It is thus defined by the Swedish writer: "The name chronic alcoholism applies to the collective

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symptoms of a disordered condition of the mental, motor, and sensory functions of the nervous system; these symptoms assuming a chronic form, and without their being immediately connected with any of those (organic) modifications of the central or peripheric portions of the nervous system, which may be detected during life, or discovered after death by ocular inspection; such symptoms, moreover, affecting individuals who have persisted for a considerable length of time in the abuse of alcoholic liquors." The symptoms of the disease depend, says Marcet,[1] in a functional disturbance of the properties of the nervous system, which may last for weeks, months, or years, even after the habit of excessive drinking has been given up. There is often something peculiar in the look and gait of individuals prone to drink to excess, or even of habitual tipplers—a trembling of the limbs, often of the whole body, or a want of steadiness and co-ordination in the movements not very unlike incipient chorea. In the daytime the patient is seized with trembling, especially when in the sitting posture; some hardly tremble at all when walking. The trembling may be very slight indeed, or confined to a particular part of the body, being frequently visible in the tongue, or only occurring at intervals. Marcet, whose descriptions we are now following, mentions want of sleep as one of the prominent symptoms of chronic alcoholism, the patient perpetually turning himself in bed, and, as soon as he shuts his eyes, extraordinary visions, mostly of a painful kind, appear before him. Complaint is generally made, also, of giddiness and headache, and a ringing noise in the ears. Hallucinations, so characteristic of delirium tremens, are very often noticed in chronic alcoholism, although usually to a much more subdued extent. They mostly affect the organs of sight and of hearing. Great weakness, especially in the knees and hips, is a prevalent character of the disease in question; and it may be considered as threatening paralysis. Difficulty of breathing perceived in the throat, as a sensation of choking, is a frequent symptom of chronic alcoholism, entirely independent of any affection of the lungs. It would seem that the habit of swallowing air, so frequently met with in those who drink to excess, is in some way or other connected with the difficulty of breathing; which latter, in fact, instead of being relieved, as it apparently is at the time, is increased by this ingurgitation.

[1] Chronic Alcoholic Intoxication.

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Of the causes predisposing to chronic alcoholism Marcet enumerates the quantity and quality of the alcoholic beverage and the time during which it has been taken; also, the age, sex, temperament, habits, and profession. He quotes McNish to say that "claret is the most wholesome wine that is known." It has been observed that wines of the same quality (bearing the same generic name), and grown in adjoining districts, do not act with equal power upon the brain. Most of the patients coming under Dr. Marcet's notice, and who suffered from chronic alcoholism, drank to a considerable extent both malt liquors and spirits. He specifies, however, some cases in which the disease was brought on by drinking beer alone. One man, aged 28 years, had always been of sober habits, and was only drunk once in his life, when no more than twelve years of age. His daily allowance of beer has been one pint, and he has taken no spirits. "Three years ago he became a teetotaller, because he found that even so little as one pint of beer daily did not agree with his health. He has suffered from the usual symptoms of chronic alcoholism for the last three years." A temperance advocate who would be heard asserting that a pint of beer daily, drank by a man in the prime of life, might, after a time, subject him to the break-down and suffering from chronic alcoholism, could not be expected to escape the complimentary epithets of ascetic, fanatic, ignoramus, etc. He would be told, with an air of triumph, and as at once refuting all heresy on this point, of the quantity of beer consumed by the English people, and of its being to them often food and drink. In reference to the time the habit of drinking alcohol has been indulged, Dr. Marcet points out the interesting fact of the disease occurring or of the symptoms becoming frequently aggravated long after the drinking to excess has been given up, and even in many cases after a complete abstinence for some time from alcoholic stimulants. A melancholy proof, this, of the long and persistent action of the poison, and a lesson of warning against first indulgences. On the score of age, as affected by alcohol, we learn from McNish that a child suckled by a drunken nurse is hardly ever healthy; it is especially subject to derangements of the digestive organs, and to convulsive affections. Dr. North has observed this latter disease to be instantly arrested by transferring the child to a sober woman. At forty years of age, or thereabouts, they who have habitually indulged in alcoholic liquors begin to suffer. One individual becomes a prey to gout,

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another to rheumatism, another to bronchitis, and another to disorders of digestion. "Now, these very diseases are known to predispose greatly to chronic alcoholism, and it is therefore not to be wondered at that this disorder should make its appearance at the above-mentioned period." The youngest patient coming under treatment by Dr. Marcet for chronic alcoholism was eighteen years of age, and the oldest seventy-five. Women seem to be much less subject to suffer from the long abuse of alcoholic liquors than men. The habits of an individual are among the most important of the causes predisposing to chronic alcoholism. As a general rule, we can say, with Dr. Marcet, that habits of indolence and idleness, independently of their acting as a strong inducement to drink, favor slow poisoning by alcohol. In its milder state, the disease has been repeatedly checked in a remarkable degree by having recourse to exercise of both mind and body. Among the predisposing causes of chronic alcoholism, Dr. Marcet lays great and deserved stress on smoking tobacco, as one of them; and he cites cases in illustration of the fact. Alcohol and tobacco aggravate, respectively, each the pernicious effects of the other. The author concludes his observations on this point by "advising young men, whatever may be their position in life, not to take to smoking, as such habit is certainly not conducive to health;" and we may add, with a knowledge of the narcotic and poisonous nature of the weed, that its use in this, or indeed in any other period of life, cannot be merely harmless. As relates to the professions or employments which most predispose to chronic alcoholism, Dr. Marcet, contrary to the once generally received and still by many accredited dictum, expresses his conviction that "such professions as exhaust the body, from their requiring great muscular exercise, especially under circumstances which excite excessive perspiration, favor the early development of chronic alcoholism; and occasionally, in these instances, a very small proportion of alcoholic beverage will be hurtful. Thus individuals obliged to remain long before a blazing fire, as furnacemen and engineers on board steamboats or in factories, are very liable to suffer from spirituous stimulants." Professions affording very little or no exercise of the mind and body predispose also to suffer early, and consequently when young, from the habit of drinking. Although a proportionately larger number of cases of the disease is found in the laboring and industrial classes, yet there still exists "a comparatively vast number of

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individuals in comfortable as well as wealthy circumstances whose nervous system becomes affected from the effects of the long-continued habit of drinking wine or spirits." The tendency of alcoholic drinks to produce "chronic alcoholic intoxication" is increased by drinking early in the morning, before breakfast, and consequently on an empty stomach, and living on a spare solid diet. This fact, one of general observation, must show the fallacy of the belief in alcohol being an auxiliary food, for at this very time it is gradually poisoning the system into a state of chronic alcoholism. It also must serve to show the error in administering morning drams either of pure liquor or in the form of bitters, early in the morning, as a preventive of fever. While the waste of the body may be diminished by the use of alcoholic drinks, the nervous system is not the less poisoned and the stomach inflamed in consequence.

Dr. Marcet enumerates what he conceives to be the immediate causes of an attack of chronic alcoholism. In these we find an exceptional excess and a severe fit of drunkenness, coexisting disease, such as inflammation of the lungs, rheumatism, or gout, the occurrence of any one of which will bring on an attack of chronic alcoholism in a person who is addicted to the use of intoxicating liquors. This chronic poisoning is often accompanied by a secondary disorder in the form of bronchitis, or, more frequently still, affections of the stomach. Cerebral concussion has suddenly developed chronic alcoholism. It may be mentioned that the symptoms of the two are very much alike.

Affections of the nervous system resembling chronic alcoholism are pointed out by Dr. Marcet. They are produced by long-continued and excessive intellectual exertions, and by sudden and violent emotions; and he has treated them successfully by the same means as those of alcoholic origin.

Although it does not come within the scope of this report to enter into details of treatment of the diseases caused by alcohol, yet reference may be made, on the present occasion, to a remedy, oxide of zinc, which Dr. Marcet regards as exceedingly efficacious in chronic alcoholic intoxication. Among its other effects, this substance produces, in a remarkable degree, sleep. It is a tonic as well as a sedative and narcotic. The author has found it to be very serviceable in cases of mental exhaustion; he has, also, prescribed it with advantage in epilepsy, chorea, mild hysteria, paralysis, and lead palsy. Gastric disorders, which so frequently accompany

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chronic alcoholism, are sometimes rapidly subdued by oxide of zinc. The addition, at night, of opium will be found useful where there is great pain of the stomach and much vomiting. In some of these cases the carbonate of ammonia may for a few days be substituted for the oxide of zinc. The usual effects of this medicine in simple cases of chronic alcoholism are improvement of sleep, increase of appetite, return of muscular power, and disappearance of mental depression. The usual dose of the oxide of zinc prescribed by Dr. Marcet was two grains twice a day, often increased to four and six grains at the same times. Bromide of potassium, and, still more recently, bromide of ammonium, have been advantageously prescribed in delirium tremens and in chronic alcoholism to quiet tremors and nervous disorders, and to procure sleep.

Among the disorders caused by alcohol we find enumerated, of late, colica pictonum. Some interesting facts in proof are given by Dr. Amos Sawyer, in the *St. Louis Medical Reporter* for April, 1868. He shows from the experience of a number of painters that the sufferers from lead colic are they who drink intoxicating liquors, and that all those who abstain from them are exempt from its attacks. We have seen that cider is recognized in some districts to be a cause of colica pictonum, or, as called here, vegetable colic.

Delirium tremens is said to be the most exact of all the alcoholometers. In a period of three years, in the Frederic Hospital at Copenhagen, there were 456 persons laboring under this disease, in a total of 9000 patients, or nearly 1 in 20. There is a stage of alcoholism preceding that of complete drunkenness, which has been called *ebrious ferocity*, manifesting itself in coarseness and brutality of deportment, and disregard of the feelings of others, particularly of the savage's own family. A man in this condition is ready to use violence, and to take the life of those who differ from or are opposed to him in any way. This variety shows itself most in individuals of great bodily strength in the uneducated class.

Ebrious moroseness, another variety of a state preceding drunkenness, is met with more in the rich and those not occupied and who have some culture and refinement. They are discontented, morose, and querulous, especially with members of their own family and friends; they are prone to babble to no purpose, are speculative and ready to engage in games of chance. On failure and disappointment they become taciturn and commit suicide. *Ebrious halluci-*

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nations of the senses are also met with in chronic alcoholism, distinct from delirium. Dipsomania, *mania crapulosa vel ebriosa*, or oinomania, manifests itself in an irresistible craving for alcoholic drinks, which overpowers all the higher feelings, and the oinomaniac is urged on to a course opposed alike by his reason and his conscience; but then resistance is vain. The disease appears in three forms: the acute, the periodical, and the chronic. The last is the most common form—that in which the patient is under the most overpowering desire for stimulants. Such unfortunate individuals, as truly said by Bucknill and Tuke,[1] are sane only when confined in an asylum. Insanity, always a severe infliction, must be regarded with additional grief by the sane friends of the sufferer when it is brought on by indulgence in alcoholic drinks, or, as it is commonly worded by intemperance; and the case becomes the more distressing when we find numbers of the female sex among its victims. The returns for a period of twenty-eight years show, in the Pennsylvania Hospital for the Insane, 389 cases of insanity from intemperance during this period, of whom 357 were males and 32 females; being, collectively, in the proportion of nearly 14 (13.9) per cent. of the 5315 patients insane from all causes. In four asylums for the insane in England the average was 13 per cent. But worse than insanity from alcohol are the dire consequences to the offspring of intemperance on the part of one or both parents. A drunken mother, for example, will give birth to children in succession who are emaciated, and as it were dried up, and who die soon after being born. At length one at a later period survives for some years, but with "the looks of an old withered baby, its skin loose and wrinkled, for it has no flesh; and is no bigger than one a month old, and no more able to walk or stand than at that age." Instances of this nature occur more frequently, as might be expected, in the case of drunken fathers, for they, of the two parents, furnish a larger proportion of cases of intemperance. It is a lamentable thing that the other sex should exhibit such a list as they do. Doctor Howe states that out of three hundred idiots in Massachusetts, a hundred and forty-five were the offspring of intemperate parents. Short of these extreme and startling examples of punishment of the children for the sins of their fathers, we meet with inherited predisposition to insanity and to other diseases, caused or acquiring greater force by intemper-

[1] Psychological Medicine.

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ance on the part of the parent. Among these morbid predispositions is the inherited love of liquor, or an appetite that prompts its possessor to early and excessive drinking if he once tastes of an alcoholic fluid. Sometimes the inherited feebleness and imbecility are not manifested until the age of puberty, when the individual shows himself to be incapable of further improvement, and sinks into a state of idiocy. Examples of hereditary degeneration, both physical and mental, are given by Dr. Morel in two sections on chronic alcoholism and the effects of alcoholic intoxication, of his instructive work.[1] This author describes the case of a young man who, at the age of nineteen years, was taken to the insane asylum at Mareville, for mental derangement caused by excess in alcoholic drinking. As the inheritor of a good fortune, he received every attention and care in his early life, but they produced no effect on a perverse and obstinate nature, whose instincts were of the most cruel kind. When but three years old, he was the terror of all the children in the neighborhood, whom he subjected to incredible tortures in the absence of older persons who would have restrained him. His chief pleasures of boyhood were in destroying and torturing animals. This young man had for his father a person who moved in educated society, and filled important offices, but who was for a long time intemperate, concealing, however, the fact from the public eye. He had five children, only one of whom survived infancy, and he was the unfortunate being now described. Edward, as he was called by Dr. Morel, evinced in his tender years a great fondness for drawing and reading, and after a time was placed at college; but his teachers soon perceived that all their efforts were in vain, and that this boy, both in body and mind, was afflicted with an arrest of growth; his head was microcephalous and his intellect limited. On his return home, he went rapidly through successive stages of degeneration by continual debauchery, until, fortunately, he was placed under restraint in an asylum. This young man labored under the double curse—1st, of inherited predisposition, and 2dly, of the example given to him by his father's excesses. Morel relates the case of another young man with similarly inherited predisposition and running a similar career of extravagance and misconduct, but pushed to greater extremes even than in the former one. Charles displayed from his earliest years the most cruel instincts. Early placed

[1] Traité des Desgenerescences Physiques, Intellectuelles, et Morales de l'Espèce Humaine. Paris, 1857. With atlas.

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at school, he was sent back in succession from one after another to his parents. It was thought that he might be subjected to some control by his being made to lead a military life, and he entered the army. Here he distressed his family by the most shameful excesses; he sold his military effects to procure brandy, and at last deserted; and he was only saved from capital punishment by the statements of physicians that he was insane and labored under an unconquerable propensity for strong drink. From that time he led a miserable existence in different asylums for the insane; leaving each of them with promises of reform which were invariably broken. It would be difficult, the author writes, to form a correct idea of the degradation and complete degeneration of this brutified being, who will end his days either in a state of general palsy, or in marasmus with an entire abolition of sentiment and intelligence. The records of our own institutions and domestic histories would doubtless furnish many cases of an analogous nature to those here described. Morel exhibits a picture of progressive degeneration of alcoholic origin, and its continuance in a family until it ended in the extinction of the latter, at the fourth generation. In the first generation, there was immorality, excess in alcoholics, moral debasement. In the second, hereditary drunkenness, maniacal attacks, general paralysis. In the third generation, sobriety, hypochondriac tendencies, lupomania, systematic belief in persecutions, homicidal tendencies. In the fourth, limited intelligence, a first attack of mania at sixteen years of age, stupidity, transition to idiocy complete and incurable. While pointing out, as warning, the hereditary predisposition to indulge in the use of alcoholic liquors and in other excesses, we are not to suppose that this is the general course of things. Happily, children who have seen the brutification of their fathers have, generally, a dread of alcohol in any form of combination, and where their surroundings are favorable and no devilish incitements offered, they would, of themselves, entirely abstain from the use of the pernicious liquor. They ought to learn, that under any circumstances they are in danger, if, by evil example or encouragement in the guise of plausible theories, they allow themselves to use intoxicating liquor in even the smallest quantity. Their inheritance, even without their following paternal or, worse still, maternal example, subjects them to many troubles and infirmities, sometimes shown in eccentricities of conduct, nervous disorders, or irritation of some particular organ. These may serve as a goad to the brain and impel the sufferer to the use of intoxicating

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drinks. Of 200 persons laboring under chronic alcoholism, and who were the subjects of Morel's observations, he found 55 whose fatal passion for alcoholics was owing to a diseased state; general paralysis occurring in temperate persons caused this morbid appetite. In six hypochondriac men and four hysterical women the most marked desire for alcohol served by its indulgence to complicate the primary neurosis, and produced such complex disturbances in the organism as to make it difficult to judge of the responsibility of the parties for their acts.

Alcohol an Inciter to Vice.—How often physicians hear the same story when consulted by a patient who has recently contracted syphilis. The sufferer had drank somewhat freely; and in a night stroll with his companions was induced to visit a house of ill-fame, and have connection with one of its inmates; he comes away with the inoculated poison of chancre or of gonorrhœa, and has ample time subsequently to meditate on the criminal act itself, and on the devilish promptings of alcohol that incited him to its commission. Could the secret history of illegitimacy be written, there would be cause for astonishment at the large number of cases that owe their origin to alcohol, which, while weakening the chaste resolve of her who had partaken of it in the shape of sparkling wine or sweet cordial, gives, at the same time, additional impulse to the delirious passion of the moment. Still stronger and more frequent is the alcoholic excitement of the other and chief party to the wrong, in the commission of which he forgets all the obligations of honor, duty, and trust. We hear much of the "greatest social evil" of the day, for the abatement of which the most praiseworthy efforts are made by philanthropists and zealous social reformers of both sexes. By none of these parties can its enormity and extensive demoralizing effects be better known than by members of the medical profession, who are so often made cognizant of the first lapse from virtue of the unfortunate females by whom they are consulted as to the means of concealing its consequences, and entreated to save them from shame by causing abortion. These poor distressed creatures, for such they are, whatever may be their station in life, are not aware of the enormity of their proposal, nor of the danger to their lives and the ruin of health by an adoption of the means of relief by an operation. But what shall be said of a physician who is so base and alike wanting in sound physiology and ethics as to be the operator in bringing on abortion, whether it be under the circumstances here supposed, or to gratify the wicked freak of a married woman

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who does not wish any longer to be a mother! This danger escaped, the physician engages in his legitimate task of helping the young mother through her confinement. She is then, not seldom, lost sight of, to make her appearance in another place in the flaunting garb and with the painted cheeks and froward speech of a harlot, who is henceforth doomed to suffer from privations, and disease, and contumely, and scorn. This is not the fate, we must rejoice to know, of all, not even of a majority of the females who become mothers out of wedlock. Throughout all this affecting drama, physicians well know that from the opening scene to the last one alcohol has been a provocative and aggravation to the misdeeds and sufferings of the unfortunate woman. Alcohol first played its sinister part in helping to make her yield to the temptation of the moment, and again, when she has recourse to it to make her insensible to the qualms of conscience and the fears of the consequence of her first deviation from the path of virtue. She flies to alcohol to drown remorse and her feelings of degradation, and, at times, to obtund the gnawing of hunger, and, as she is told, to keep her warm under her scanty clothing. She is now a miserable drunken outcast, and hence the greatest impediment to the prostitute being brought back to penitence and the abandonment of her evil ways is alcohol, taken as it is to the extent of producing frequent inebriation and of destroying all remains of moral sense and womanly feeling.

We cannot better terminate our account of the large share alcohol has in relation to etiology, or as a cause of disease in so many forms and varieties, than by giving the chief results of a series of observations, made by Dr. Marcet, on this subject.[1] The writer bases his conclusions on 695 out-door hospital patients, whose cases he has arranged in a series of groups, as relates to their employments, fifteen in number, and to their diseases, nine in number. The first series included no less than one hundred and twenty-seven different employments. These were so grouped that in-door employments were separated from those carried on in the open air. He gives a *fundamental table*, showing the proportion of "sobers and drinkers" in connection with diseases and employments, from which he deduced the "influence of alcohol as a general predisposing cause of disease." The result of his observations show that, of the whole number of patients (695), two out of every

[1] British and Foreign Medico-Chirurgical Review, vol. xxix. 1868.

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three were predisposed to disease from the habitual use of alcohol; by some merely to exhilarate, by others to cause drunkenness. The greatest proportion of alcoholism was found among shopkeepers owing to their in-door life, want of exercise, and of fresh air, by which they are prevented from throwing off alcohol by respiration as freely as porters who are heavier drinkers. Febrile disorders most abound in drinkers compared to sobers, irrespective of their employments. Both to prevent primary attack and recurrence of fever and ague, strict sobriety is demanded—a conclusion at variance with the popular but erroneous belief. "This influence of alcohol as a predisposing cause of febrile diseases probably results from the abuse of alcohol interfering with the healthy process of nutrition and lessening the general standard of health—a morbid poison exerting thereby more readily its baleful action." It must be evident, from what Dr. Marcet had said just before, of the prophylaxis against fever consisting in strict sobriety, and the so much greater predisposition of drinkers to be attacked by fever, that the use at all of alcohol by persons thus exposed is an abuse of this article. In regard to the group of diseases of the lungs, the writer's tables confirm the received opinion that drinkers are much more disposed to these, in comparison with other diseases, than sobers. In no other disease or group of diseases throughout the whole table is the proportion, and, consequently, the predisposition so great as in laryngitis. In speaking of diseases of the stomach and intestines, it is said that *gastritis* is much more liable to be brought on by drink than disorders of the intestines. Alcoholic excesses are regarded as a predisposing cause of cutaneous affections. The cases of gout and rheumatism number 151 in the 695, and it was found that the predisposition to them from alcohol was a little less than the corresponding predisposition to all other diseases taken collectively.

The inferences from these observations and estimates made by Dr. Marcet are of great practical moment, inasmuch as, while themselves supplying data, they prompt to a careful study of the prevention of diseases—a problem, the solution of which interests a far greater number of persons than attempts, necessarily of an uncertain and imperfect nature, to cure. The success of the first would render the second unnecessary, and not only save many lives in every community, but also the feelings, the time, and the productive industry of the sick and of their families, and their friends and attendants. Of the 695 cases of disease rated and clas-

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sified by Dr. Marcet, two-thirds of the entire number, or 463, were caused by indulgence in alcohol, and were preventable on the simple condition of abstaining from that liquor in some form of combination or another. If these persons, in place of being "drinkers," had been teetotalers, what tax would they have paid for their exemption from disease? None whatever. But, on the contrary, they would have enriched themselves by improved health, a better frame of mind for personal and social enjoyment, and more ability to gain the means of livelihood for themselves and their families. The loss of life by preventable diseases is begun in infancy and continued to old age. In the first period it is brought about by a defective supply of the mother's milk and its vitiated quality, and by other errors in diet and regimen generally. In the second, it is largely induced by the free and continued use of alcohol. The child is not, however, exempt from the poisonous effect of this article; for the little being, although not drinking it, receives it from the milk of a drunken mother, as it does some kindred poison from the milk of the cow fed on distillery slops. Governments wisely enact laws with penalties for their infraction, to prevent the introduction and spreading of contagious diseases—smallpox, etc., and will not allow of the sale of damaged or unwholesome food; but we look in vain for similarly preventive measures against the production and diffusion of alcohol, the great poisoner and corrupter of the blood, the producer and fermenter of diseases in their worst and most malignant forms, the disturber of the peace of families and communities, the inciter to rebellion against country and God. Governments will not see "the following fact, which has received overwhelming proof, that the least habitual excess beyond a very moderate indulgence in fermented beverages lowers the vital properties of the blood, destroys the normal tone of the nervous centres, and, as a constant *sequela*, most powerfully predisposes the frame to the absorption of epidemic virus of whatever kind. Pure aerated blood affords the best safeguard against the attacks of any epidemic. But the more perfect system of house ventilation, cleanliness, etc., will fail to secure this, if by the constant imbibition of alcohol in excess the functions of the lungs and skin are interfered with, their health-relations destroyed, and their waste products retained within the current."[1] When this intelligent writer speaks of "the constant imbibition of alcohol in

[1] Mr. W. J. Coxe, Epidemics and their Every Day Causes. San. Rev., vol. iv. p. 260.

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excess," we ought to understand its constant imbibition as always an excess, and assuredly so if a "step beyond the very moderate indulgence in fermented beverages" have the deleterious effects described. In many of Dr. Marcet's patients, alcohol taken to the extent merely of causing exhilaration, was an excess, and a cause of disease. Derangement of function will follow the very first drink of ardent spirits, as in the two cases related by Mr. Coxe, in which, on comparing the amount of carbonic acid evolved from the lungs one hour before, with that given out one hour after a dose of whiskey to the parties experimented on, he found in the first a reduction of 250, and in the second of 280 cubic inches of carbonic acid.

THERAPEUTICS.

Two great obstacles interfere with our obtaining correct knowledge of the therapeutical value of alcohol. The first of these is imperfect pathology, which prevents our ascertaining the real character of the morbid phenomena that we are called upon to remove; and the second is in the preconceived notions or belief of the action and effects of alcohol in health. The still popular and too often professional belief is, that debility and stimulants stand towards each other in the relations of disease and remedy; and alcohol, as a genial stimulus, and even *quasi* tonic, is made the representative of the entire class, and its use is directed in the debility and prostration arising from fever and inflammation; mainly on the faith of its alleged restorative and strengthening power in the temporary feebleness, and languor, and exhaustion from fatigue, sometimes occurring in ordinary health. Alcohol, under this creed, was given in disease to stimulate and rouse the system from a state of prostration, and to excite the flagging organs to greater functional activity. But in later days, under the theory of metamorphoses of tissues, and of their destructive activity in acute diseases—febrile, inflammatory, etc.—alcohol is prescribed still as a stimulus, but a stimulus which is endowed with a new property of abating this activity of metamorphosis, by acting as a sedative. Strange and contradictory effects are thus expected and believed to arise from alcohol as a medicine. At one time it is to stimulate the weak to become strong, to rouse the torpid organs into full functional activity, and to awaken from stupor and coma in the advanced stage of fevers; it is also to enable us for a time

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to do without food and sleep. At other times alcohol is to calm nervous irritation, to procure rest and sleep for the feverish and delirious patient, and to quiet the ravings of insanity. On all these several occasions it is still called a stimulus, and the impartial inquirer finds himself under the necessity either of denying at least its alleged good effects, or of insisting on the action of the remedy being designated by a word or words expressive of its compound properties. When alcohol relieves gastric pain, colic, and neuralgia, it acts as an anæsthetic or sedative; when it brings on heaviness and sleep, and in greater degree stupor and temporary coma—a condition too often seen in a drunken man—it is manifestly narcotic. The stimulant property which is so commonly assumed for it is less seldom displayed, or rather we should say that it is soon lost in and succeeded by its property of narcosis. But it would appear from the experiments of Dr. Edward Smith[1] that the first effects of alcohol, in the shape of brandy taken by a temperate man, are not those of increased excitement, but, on the contrary, display themselves in lessened consciousness, lessened sensibility to light, to sound, and to touch, and relaxation of the muscles connected with the reproductive system. There is in fact diminished vitality, a striking evidence of which is seen in the lessened ability to generate heat. Dr. Chambers, in noticing these experiments, sees in them proof of the primary as well as secondary action of alcohol—showing a diminution of vitality in the nervous system. If we would do justice to the subject, we must take up alcohol, with a knowledge, of course, that we have in hand an active poison, and inquire into its operation and effects, curative and toxical, as we do into those of opium, henbane, belladonna, aconite, nux vomica, prussic acid, arsenic, and corrosive sublimate. So far there is no consistent theory to guide us; materials are not wanting, but they lack connection and arrangement; and until we are better instructed in these respects, we must feel ourselves justified in simply saying that a patient with fever, to whom alcohol had been administered, was alcoholized, and that certain symptoms indicative of relief, or the reverse, followed. It is common enough for us to speak of a patient having been mercurialized, without our thinking it necessary to attempt to explain the *modus operandi* of the mercury that had been taken, and the farthest to be expected of us in this way would be to call the medicine an alterative. So should we talk and write about alcohol; let

[1] Op. cit.

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its effects in a case of fever be carefully noted from the beginning to the end, without our being biased by previous theory, or making our record in a speculative nomenclature. It will not be enough to say, "My patient got well under the stimulation of hot toddy, milk-punch, wine, etc.," or "My patient died, notwithstanding his free use of stimulants, in a state of stupor and coma. I did all I could to keep him from sinking." Nor will it be satisfactory to be told that a patient in fever took pints, if not quarts, of spirits and of wine, unless we learn, at the same time, the precise dose and the interval elapsing before the next one, and the symptoms from hour to hour following the ingestion of the alcoholic drink. We have clinical details sometimes quite minute of the history of a case of fever, or of pneumonia, etc., but we have no detail, indeed no mention, of febrile separated from alcoholic symptoms, and we seldom hear of the degree of intelligence of the nurse or other attendant, who is left with discretionary power to ply the patient during the night with the prescribed alcoholic, ignorant or unobservant of its effects all this time. Alcohol as a substance circulating in the blood, and soon finding its way to the brain and liver, is, during the entire period of its administration, constantly and powerfully acting on the organism for good or for evil. Its effects on the nervous system and heart are our chief guides in directing a continuance of or regulating the dose; but other organs, although slower to be impressed by it, are more retentive of its action, and a single spoonful of brandy, which will in part escape through the eliminating organs, may remain for hours in the blood, and a still longer period in the tissues of the different organs in which it was deposited. As an aid to an investigation of the subject, and to greater precision in noting the varied effects of alcohol, we would refer to the valuable work of Dr. Anstie on *Stimulants and Narcotics*. Although we differ from him most pointedly when he insists on alcohol being a food, we must admit the wisdom of his cautionary advice to prevent its common use its prescription in disease being made a reason or pretext for its being taken in health. Numerous experiments—mostly on animals—give additional force to his opinions. While specifying with great care the stimulant as separate from the narcotic effects of alcohol, the author attributes to stimulation a range of action and therapeutical effects, which in common are thought to be produced and explicable by the operation of sedatives and narcotics. Stimulants, as such, are to his mind almost always quieting and

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soothing in disease; narcotics are of doubtful utility, and for the most part, as far as represented by alcohol, are injurious. His mode of viewing these vexed questions may be in a measure understood from his remarks on "Narcotic Inebriation," or drunkenness. "This remarkable condition has been frequently very incorrectly described. Its first stages have been represented as the result of the preliminary 'stimulant' influence which is exerted on the brain by a particular class of narcotics. It has been said that alcohol, the ethers, chloroform, Indian hemp, camphor, and some others, when given in large doses, are at first intensely stimulating, but that a secondary depression quickly arises, which disturbs all the intellectual powers. It is, however, highly improper to give the name 'stimulation' to that effect which is produced by a dose of any narcotic which places the taker in such an unnatural mental condition. In order to make this more clearly perceptible, I shall now analyze, with some minuteness, the phenomena of the inebriation produced by alcohol, by chloroform, and by hashish respectively.

"When an excessive or narcotic dose of alcohol is taken into the stomach, the symptoms will vary according to the rapidity with which the blood becomes saturated with the poisonous agent. A certain interval will elapse during which only so small a quantity shall have been absorbed through the stomach walls as may stimulate the nervous matter when carried by the circulation to the brain; and this interval will be long or short according as more or fewer obstacles to absorption have existed, such as dilution of the alcohol, or mechanical obstructions (*e. g.*, food in the stomach). But from the moment that a certain degree of saturation of the blood is overpast, and the so-called 'phenomena of excitement' commence, stimulation is entirely at an end, as we may plainly perceive from the fact that the nervous system, in all its parts, is becoming paralyzed. The first warning of alcoholic inebriation is flushing of the face, an occurrence which indicates that the cervical sympathetic is becoming paralyzed; this is a symptom not peculiar to the action of alcohol; but when caused by that narcotic is always a sign that paralysis of the hemispheres is commencing. It is about this period, or soon afterwards, that the drinker finds himself in unnaturally high spirits; that his animal passions are most prominent; that feelings of vanity carry him away into garrulity of talk, and that whatever sentimentalism there may be in his nature is apt to come out, often ludicrously enough. As more and more alcohol begins to circulate through the nervous system, and espe-

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cially through the brain, fresh mental peculiarities are developed, but always *in a certain orderly sequence*, although this fact easily escapes observation. The clue to a right appreciation of the successive phenomena is this: that the feelings ordinarily suppressed by voluntary effort, or observed by the impressions of actual life, are displayed, by the removal of the customary veils, *in the order of their concealment.* Reason and prudence, and the moral sense which form the varnish, mostly a thin one, superimposed upon the sensuous nature, vanish simultaneously with the faculty of estimating ideas of time and space, and with the power of active co-ordination of the muscular movements. It is now that the truth of the proverb begins to be most completely realized, '*in vino veritas*,' for the very most hidden things of the mind come out."

Stimulation resolves itself, according to Dr. Anstie, into a group of physiological effects, of which we give the simplest expression in saying that they one and all tend to restore the healthy standard of some vital process or processes. And again, he says: True stimulation is the supply of some missing influence requisite to the maintaining of that balance of the powers and materials of existence which we call life. The type of the stimulant class is therefore found in foods, with the power of adding to formed tissue, or to the unformed elements of the body—water, salts, or metals deposited or held in solution, etc.—and by evolving heat, which again may be converted into electricity. What the writer here says of stimulation neither explains nor defines, and the same language would be equally applicable or inapplicable to a remedial mode of action produced by tonics, alteratives, etc.

Narcotics, says Dr. Anstie, are distinguished by one central feature which marks their influence upon the organism, viz., the production of consecutive paralysis of the various portions of the nervous system. These effects do not appear to be caused, in the slightest degree, by doses which are of less than a certain amount. Most if not all narcotics, when given in smaller doses than those required to produce the lesser degrees of narcosis, act as stimulants. The stimulant action is not produced in the slightest degree by narcotic doses. The symptoms of alcohol narcosis are very similar to those produced by chloroform and ether. There is the same gradually advancing sensor and motor palsy, commencing with the lower portion of the body, and blended and confused with the effects on consciousness produced by palsy of the brain. Narcosis proper may be described as a physiological process in which the

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nervous system is deprived, by the agency of a poisoned blood-supply, of its vital characteristics, with greater or less rapidity, and which directly tends to produce general death of the organism by means of such deprivation.

In repeating these views of Dr. Anstie on stimulation and narcosis, we contribute something to a better understanding of the therapeutical value of alcohol, and the ends to which we should look when administering it. But it is not easy to carry in the mind a clear perception of the precise dose of alcohol, and the time and circumstances under which these two conditions of the system occur or are produced. On one cardinal point he is not as clear as could be desired: it is that of mistaking action for power, and of regarding that which is in fact only borrowed, as an actual increase of capital. As justly said by Dr. Paris, we cannot infuse into the body any specific elixir from the vials of the laboratory; "we cannot directly increase the *vis vitæ;* but by removing the obstacles which oppose the effects of nature, we can enable her to do so." The restoration can only be done by means of the vital stimuli, food, air, water, and heat.[1] The most that other stimuli can do is to excite a reaction injurious, as Muller very properly remarks, in proportion to the change effected by them in the organic composition. "An endless injury has been done to medicine, and many lives have been lost through the error of confounding all agents which excite reaction in the system with those which are absolutely essential to life, and which renovate while they stimulate the organs; the false notion having been thereby induced that, because stimuli feed as it were the flame of life, stimulating agents generally are necessary to life." The theory is changed, but the Brunonian practice is renewed in all its former power, we were going to say virulence, by the free administration of alcoholics in most of the acute, and many of the chronic diseases which come under medical treatment. Let us hope that fifty years hence there may not be occasion for the remark made by a medical writer in the early part of the present century—that the Brunonian doctrine, and the practice growing out of it had destroyed more lives than all the wars of the French Revolution. The writer probably meant to include in this censure the results of the dietetic habits which were strengthened and greatly increased by Brown's teaching. Dr. Rush repeats what has been often said that spirituous liquors destroy more lives than the sword.

[1] Pharmacologia.

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Alcohol occupies a foremost place, with many practitioners, in the treatment of fever at the present time. We need not dwell on the details of the alcoholic practice carried to its extremes by Dr. Todd; but shall speak first of its somewhat modified features based on experiments and a show of plausible pathology by Dr. Anstie, who warns us, however, against an undue persistence in the use of the remedy in general. Thus, for instance, after speaking of the great relief in neuralgia afforded by the use of a moderate dose of alcohol, he adds the remark that if the article is to be administered at all for this purpose, it should be given with as much precision as to dose as we should use in giving an acknowledged poison. Admirable caution, and applicable to every form of disease or infirmity in which alcohol is prescribed! In another place the writer, when telling us of the powerful effect which alcohol often exerts in averting threatened *epileptiform attacks*, confesses that he hesitates to order its employment by any epileptic, unless he be a person of great intelligence and firmness of mind, on account of the almost inevitable tendency which patients have to overdo any remedy which they fancy will avert some terrible danger—a measure which in the case of alcohol might have the disastrous effect of leading to habits of drinking.

The classical illustration of the favorable soporific influence of alcohol, to use the language of Dr. Anstie, is to be found in its use in *low fevers, such as typhus and typhoid.* In cases of these diseases, a certain rapidity of pulse shows that the patient cannot obtain natural sleep, but will pass into a state either of coma or delirium, and that under such circumstances it too often happens that meat, broth, etc., cannot be retained by the stomach. "Notwithstanding all that has been said by persons who have never fairly tried the plan, there is nothing which meets the exigencies of this condition with an efficiency which at all approaches that of alcohol in repeated non-narcotic doses." A case is given of a woman, aged 36 years, suffering from typhus fever, who was seized on the tenth day of the disease with rather violent delirium, the skin was hot and rather dry, pulse 146. Six ounces of brandy per diem had been allowed so far; the quantity was now doubled. During the next twenty-four hours the pulse came down to 120, the delirium ceased, and the tongue became less dry than it had previously been. A test of the injurious or narcotic effects of alcohol, where the dose has been beyond the wants of the case, is found, writes Dr. Anstie (*Lancet*, 1868, p. 121), by distillation of an ave-

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rage sample of the twenty-four hours' urine. If renal elimination to the extent of one grain *per diem* be proved, it may be confidently asserted that a more or less poisonous effect has been produced, more especially if the sphygmograph gives the evidences of lowered arterial action.

The supporting treatment, in which, among the medicinal agents, alcohol has been assigned a high rank, is that advocated by Dr. John Hughes Bennett in continued fever, which includes typhoid and typhus. His practice partakes, however, of the eclectic (not the shallow teaching so called) as well as of the alcoholic. At the beginning, or the stage of excitement, this writer directs saline antimonials, slight laxatives if occasion requires them, and he orders the head to be shaved and cold applied. Fluid nutrients, such as milk and beef-tea, are given from the first, and wine and other stimulants as soon as the pulse becomes weak after having been rapid and strong, but still retaining its frequency. The quantity of wine usually given is from three to six ounces a day; but in some cases marked by unusual depression, or when the individual has been previously accustomed to alcoholic drinks, a larger quantity, or, in its stead, from one to four ounces of spirits may be required. Caution is given not to continue the use of stimulants longer than is necessary. The same general rules are laid down for the treatment of eruptive fevers that are recommended in that of continued fever.

Dr. Wood assures us[1] that in low febrile diseases alcoholic liquors are a most valuable resource, and, indeed, indispensable. They are not, he thinks, so well adapted to the prostration or collapse which sometimes occurs in the cold stage at the commencement of the fever as to the debility coming on in its course. In this latter condition, which so often supervenes in febrile diseases, and not unfrequently constitutes their greatest danger, they are adapted beyond all other medicines by the universality as well as the energy of their stimulant property. Unless the prostration is sudden and alarming, the mildest form of these stimulants should be first employed, and recourse be had to the strongest only as increasing debility may seem to require them. Thus, it is usually advisable to begin with wine-whey, then, if necessary, to advance to pure wine, and ultimately to ardent spirits. Dr. Wood expresses, we believe, the opinion of most practitioners, when he tells us that alcoholic liquids may often be advantageously used in scarlatina,

[1] Therapeutics and Pharmacology, vol. i. p. 658.

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diphtheria, smallpox, and erysipelatous fever, and occasionally in bilious remittent and yellow fevers, when they present typhoid symptoms. Even the existence of inflammation, under these circumstances, does not positively contraindicate their use. Active alcoholic stimulation is often necessary in typhoid or typhous pneumonia. We should have stated that in these specifications of diseases laid down by Dr. Wood it is in typhus, enteric, or typhoid and petechial fevers that the alcoholic remedies generally prove most serviceable. He believes the same treatment, in this particular, is applicable, to the advanced stage of inflammation when copious suppuration takes place, also to various constitutional affections attended with suppurative or ulcerative conditions. Dr. Gerhard, giving in a measure the results of twenty-three years' experience of hospital practice, says[1] that in the treatment of typhoid fever he sometimes gives alcoholic stimulants in large doses, and in many instances considers them totally unnecessary—a discrimination which we could wish to see displayed by some of the wholesale prescribers of alcohol in every stage of a fever. Dr. G. considers it necessary to give the patient some stimulants in typhus fever. Some patients, he tells us, will require large doses, others will do well on small portions. Dr. J. F. Meigs, in a valuable paper on the "Morphological Changes in the Blood in Malarial Fever," gives cases of different forms of severe and malignant remittent fever in which he prescribed with benefit, in the Pennsylvania Hospital, alcoholic stimulants, chiefly in combination, as in the form of milk-punch.

As an offset to the stimulating practice of Dr. Anstie, we must refer to the moderate and non-stimulant course pursued by Dr. Weeks, of Guy's Hospital, in certain cases of fever. In a clinical lecture delivered by him[2] he reminds his youthful auditors of what they had themselves witnessed, viz., that fevers will do well without alcoholic stimulants. "Of course," he said, "stimulants are often needed, but young persons with typhus and typhoid fevers do better, I believe, without them." The lecturer adds: "That they make good recoveries on a simple milk diet is a fact which my hospital cases prove, and which no arguments can gainsay; and, on the other hand, I have seen a marked improvement take place in some cases where a stimulus has been left off." The same thing occurs in bronchitis and in regard to heart disease—rather a

[1] Pennsylvania Hospital Reports, 1868. [2] In Lancet, 1867.

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vague term. Dr. Weeks is convinced that the amount of mischief done by stimulants is immense. A constant stimulation by alcohol of a diseased and weak heart adds greatly to the trouble.

Worthy of commendation are the views on the treatment of typhus fever inculcated by Dr. Chambers (*Lect.* VI.). As to the use of alcohol in fevers, he is guided almost entirely by the condition of the nervous system. If there is very complete prostration and delirium of a low muttering character, it is required. A tremulous state of the muscles, marked especially by a quivering of the hands and fingers, is a good test of the necessity for it, and so is a sharp, weak, unequal action of the heart. All these indicate that the nervous system is feeling very sensitively the destructive metamorphosis going on, and has its power lowered by its sensitiveness. "Then is the opportunity for the powerful anæsthetic alcohol which in severe cases you see me order without scruple, but which I do not rank as part of the necessary *methodus medendi* of fever, and have not yet ordered it for the boy we have been prescribing for. Above all, I would caution you against employing it as a substitute for the treatment which I have been describing. Wine may be useful as an adjunct, but never must it take the place of the true restoratives." One cannot but admire the wise caution and well-timed rebuke, in these remarks, against making the occasional and admittedly serviceable use of alcohol in fever, a foundation for a system of large, continued, and exclusively alcoholic treatment of this disease. Dr. Chambers regards the alcoholic as an exceptional mode of treatment, just as he does the local abstraction of blood, of which, in treating this fever, he gives examples. The case of a girl, with typhus fever, is given, who complained much of pain in the right iliac fossa, which was treated by leeches and mercury, with immediate relief. Justice cannot be done to the subject, nor to the lecturer in regard to his views of the proper places of alcohol in continued fever, unless we follow him in the successive division of the means which he recommends to combat the disease. The once popular practice of giving an emetic at the beginning of fever is renewed by Dr. Chambers, with results which he regards as very satisfactory. He inclines to an opinion of the etiology of typhus which was taught half a century ago by Dr. Chapman, of the University of Pennsylvania, viz., that the most usual path of ingress of the febrile poison is the digestive canal. The English lecturer tells us of several instances of the success of the emetic treatment which removes an essential part of the disease. Wine

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and emetics were given in both classes of continued fevers; the wine, as usual, in accordance with the patient's age and the condition of the nervous system, and emetics whenever the history we could elicit made us conjecture that the fever was in its first week.

Following the emetic will be sponging the whole person of the patient three or four times a day with tepid water, to which the nurses more generally add some distilled vinegar to make it more agreeable. Cold affusion is sometimes resorted to with benefit; but it should be withheld where pneumonia is present, or where the patient has recently had an attack of acute rheumatism. The most important indication in the treatment of the low forms of fever, is to give a large supply of nitrogenous material which had been wasted and carried away by destructive metamorphosis. "The suitablest food," says Dr. Chambers, "is that which is naturally supplied to the weakest stomach. The feeble digestive organs of babies can assimilate milk, and milk forms the most appropriate nourishment for the debilitated viscera of the fever patient. By giving two or three ounces every hour, you may get down a quart and a half *per diem*. But in ordinary instances every two hours is often enough, and that period is adopted for the boy before us. If there is sufficient acid left in the stomach to coagulate the casein into clots, and cheesy lumps are rejected by vomiting, as happens sometimes in milder cases, you may guard against this by adding *liquor calcis* or soda water to the milk, or you may replace it by beef-tea." Lumping of the cheese into solid masses, not acidification, is to be avoided. "Sour buttermilk is by no means to be despised as a food." It is quite a relief to those who look for the natural means of restoration in exhausted states of the system, to find a true nutrient recommended, as in the case of milk, without the equivocal but among a large number of practitioners the almost inevitable addition of alcohol. Better by far to give the two separately, and not be prevented from continuing the milk because the alcoholic fluid—whiskey or brandy—disturbs and disagrees. The former will be administered without interruption at short intervals; the latter, if at all, at longer periods. The milk is urgently wanted to fill up the bloodvessels; the alcohol is at times serviceable to soothe the nervous system, but it makes no blood, nor helps to make any. Eggs are universally admitted to be a highly nutritious food; "if taken raw and diluted with milk or water, they are quickly absorbed. But should they be delayed and putrefy, the products of their decomposition are particularly

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injurious; the sulphuretted hydrogen and ammonia are poisons to the intestines. I should recommend you," continues Dr. Chambers, "to avoid eggs till convalescence has restored the gastric powers. The same objection does not lie against milk, the lactic acid arising from whose decomposition assists in the solution of the casein."

The means which Dr. Chambers recommends to combat typhus fever are—1st, an emetic; 2d, repeated sponging the entire surface of the body with warm water; 3d, the free use of nitrogenous material for nutriment, to supply the large waste by the fever; and 4th, remedies drawn from the pharmacopœia. Of these, the first in the order of therapeutic value, as accredited by Dr. Chambers, is hydrochloric acid diluted, in a dose of twenty minims with water and syrup every two hours, as in the following prescription: ℞.—*Acidi hydrochlorici* ♏xx, syrupi ʒj, aquæ ʒj, *alterna quâque horâ sumat.* The acid, on somewhat theoretical grounds, is prescribed in low fevers in which there is supposed to be a super-alkaline condition of the fluids, according to Dr. Richardson, or a sub-acid, as suggested by Dr. Chambers. This gentleman asks: "What blood when analyzed comes nearest in its altered proportions to the blood in low fevers? Is it not that of scurvy and purpura? There is the same excess of blackened (melanosed) blood disks, the same deficiency of neutral salts and organizable (coagulable) lymph. Everybody treats these chronic affections with acids, and why not also an acute affection which corresponds with them on one point at any rate? As to the particular acid employed, muriatic certainly deserves to be tried before others—first, because it is such a large constituent of the body that it might almost be called a food instead of a medicine; and secondly, because it is such a powerful arrester of the decomposition of animal matters." Dr. Chambers presents the therapeutical statistics of two classes of patients with typhus fever. The first, numbering 109, were treated on what may be called "general principles," leaving a mortality of 23; the second, in number 121, were treated by continuous nutriment and hydrochloric acid, with a loss by death of only 4. Both series were spread over a considerable number of years, so that they include sporadic cases as well as the produce of epidemics. "They were all treated by the same physician in the same wards of a general hospital (where the cases are usually more severe than in special fever hospitals), and they nearly all came from the same group of districts, of which our hospital is the centre." The treatment in the second series, addi-

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tional to the use of the hydrochloric acid, consisted in sponging the body two or three times daily with tepid water when the skin was hot and dry, and, in a few instances, in leeches or cupping applied to the exterior of inflamed localities in the abdomen or chest. The difference in the result of the two methods of treatment in the two series of cases is very striking; the deaths in the former were 19½ per cent., or nearly 1 in 5, and in the latter 2½ per cent., or only 1 in 40. The continuous liquid nutriment, given every two hours in the last series of cases, consisted of strong beef-tea and milk, of which, together, about six pints were administered in the twenty-four hours. Dr. Henderson, writing from Shanghai (China), states that the employment of the hydrochloric acid there diminished the mortality of continued fever from 20 per cent. to 7 per cent., certainly a very marked decrease, and in a totally different climate from that of England. It is after giving the above *methodus medendi* in fever, that Dr. Chambers introduces alcohol to notice as a secondary and exceptional though at times an efficient remedy, in the terms which have been previously cited.

Counter testimony to the alleged febrifuge virtue of alcohol is offered by Pucinotti, an Italian writer, who attributes the severity of the fevers, with which the country around Rome is afflicted, to the use of spirits and other stimulants used by some as preventives. He relates the case of an old man who had come from Romagna every second year to labor, during the harvest, in the Campagna of Rome, and who never had the fever. His beverage in the morning and through the day was *cold water with a little lemon-juice.* This practice his father had adopted before him, and with the same happy result; but his two sons, who would use *spirit* (brandy), and even mixed with it at one time *gunpowder*, and at another *cayenne pepper*, both fell victims to the fever.

The alcoholic treatment of *delirium tremens* still has its advocates, and, if received, would constitute an exception to all medical experience in other diseases, viz., that the marked and extreme effects of a poison should be removed by large and repeated doses of the same poison; that alcohol should be both bane and antidote, a cause and a cure of delirium tremens, giving rise to fatty degeneration of the blood and removing it at the same time. The medical skeptic might ask whether the patient with this disease gets well on account of or in despite of the alcohol used. At any rate, if we admit that the disease is cured by any drug, as in Dr. Joseph Klapp's successful cases after the administration of an emetic, those

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with the like results after the use of opium by many practitioners, and the numerous cases treated by Dr. Dunglison at the Philadelphia Hospital (Blockley) on the expectant and eclectic plan, but without a drop of alcohol, and with entire success, and the equally successful but contrasted practice of free alcoholic stimulation in 160 cases in the above hospital, it is very evident that the disease will disappear under opposite and neutral modes of treatment. Dr. Bennett thinks that nutritive stimulants will for the most part suffice, as far as relates to internal means. One thing is clear, that, if it can possibly be avoided, the doctor ought not to leave his patient, after an attack of delirium tremens, a drunkard as much as he found him one, and as liable as ever to continue to be a drunkard. When the poor creature is told that although alcohol made him ill, alcohol also made him well, he will exclaim, Hurrah for alcohol, and a fig for water-drinkers and total abstinence! Dr. Handfield Jones, in his *Clinical Observations on Functional Nervous Disorders*, makes some instructive statements on the pathology and treatment of delirium tremens. He cites the views entertained by different writers, that the disease presents itself under two states, which are sometimes so many stages, viz., one of inflammation and high irritation of the brain and its meninges, and the other of exhausted nervous energy or collapse. A similar division is made of traumatic delirium. There should also be a separation of cases where the symptoms ensue immediately after casual alcoholic excess from those in which this is not the case. Dr. Peddre tells of his having treated eighty cases of delirium tremens successfully by tartar emetic, in doses of a quarter to half a grain in simple solution, every two hours, or at shorter intervals, according to the degree of excitement and irritability. The action of the antimony seems to be chiefly sedative, or, to use the language of the Italian school, contra-stimulant. Dr. Ware points out the natural termination of the disease by sleep in sixty to seventy hours, dating from the time when the state of entire watchfulness and delirium commences. The mere expectant treatment, he tells us, gave but one death in twenty-nine cases; while out of fifteen cases treated with opium, in small or large doses, six died, two of them being complicated. In the Edinburgh Infirmary, where for many years the disease seems to have been treated with laudanum and whisky in a very careless manner, the mortality is stated to have been 35 per cent., and in St. George's Hospital 14.6 per cent.; in the infantry regiments 17.6 per cent., and in the cavalry 13.8 per cent. On the

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other hand, Dr. Gairdner's experience at Edinburgh is of one death among thirty cases "treated in an extremely simple and natural manner:" Laycock has treated sixty-eight cases of delirium tremens without opium or stimulants, and has had only two deaths. This writer assigns six days as that of the self-limitation of the disease. A safer sedative than opium is the extract of hyoscyamus in doses of ten to fifteen grains, or of a drachm of the tincture, repeated at intervals. Tincture of digitalis, in a dose of half an ounce, has often a very soothing effect. Eight ounces have been given in a period of a few hours. In the English hospitals we find that Dr. Fincham of the Westminster, Dr. Maclean of the Netley, Dr. Fleming of the Queen's, Birmingham, cut off at once all alcoholic stimulants and rely on pure air, quiet, seclusion, and nourishing and palatable food, supplied at short intervals. The treatment pursued by Dr. Goodfellow of the Middlesex, and Dr. Harvey of the Aberdeen Royal Infirmary, is mainly expectant and dietetic, abundance of nourishing food being allowed.[1]

In the *phlegmasiæ* generally the stimulating is replacing the depleting and reducing treatment—a bound from one extreme to the other. Dr. Anstie reports a case of double pneumonia in a man aged twenty-four years, who for ten days lived on nothing but brandy and a little water. In the first part of this time he took twelve ounces of the liquor daily, and ultimately twice this quantity. In a month from the day of the doctor's first visit the man was well enough to resume his work. Dr. Bennett adopted with great success in this disease what he terms his treatment by restoration, directed to further the natural progress of the disease and to support the vital strength. During the period of febrile excitement he contented himself with giving salines in small doses, with a view of diminishing the viscosity of the blood. At the beginning of the treatment he ordered as much beef-tea as could be taken; and as soon as the pulse became soft, nutrients and from four to eight ounces of wine daily. As the period of crisis approached, he gave a diuretic consisting of half a drachm of nitric ether, and sometimes ten minims of colchicum wine three times daily, to favor excretion of urates. But when crisis occurred by sweat or stool, he took care not to check it in any way. Of 129 cases of acute pneumonia treated by Dr. Bennett in the wards of the Edinburgh Infirmary, during a period of six and a half years'

[1] British Medical Journal, July, 1869.

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service, the deaths numbered only 4, or 1 in 32¾ cases; and of all the cases of uncomplicated pneumonia, 105 in number, not one died—a most extraordinary result, when it is remembered that in other places, under different modes of treatment, the mortality was from 1 in 4 to 1 in 9½ cases. It is to be feared that there is great lack of precision of statement, and too rapid, if not vague, generalization, in speaking of the treatment of pneumonia, and, indeed, of inflammations in general. One of the worst epidemics, and one attended by disastrous results, is that affecting the minds of physicians, so that the fears and prejudices, the isolated and exceptional experience of a few, are communicated to the profession at large, and received by it as a body of well-established and coherent facts. In some cases of pneumonia, bloodletting has been found unsuccessful; in others, injurious. A specification of the true character of these cases, not only of the extent of the organic lesions of the lungs, but the associated circumstances of age and habits of the patients, complications with other diseases—typhoid and typhus fevers, measles, scarlatina, phthisis—is necessary to enable us to form a judgment of the effects of treatment. These effects in one case constitute no absolute guide, and scarcely a strong probability in another case; and hence to tell, without suitable specification, that we depleted freely or stimulated largely in pneumonia, conveys no definite information. Of one thing we may be very sure, that the out-and-out course of treatment, whichever it may be, is wrong, if not mischievous. It is misleading, also, to make the predominant feature represent the entire treatment, which is, or ought to be, different in the different stages of the disease. The time has probably passed forever when physicians will follow the practice of the last of the Gregorys in the Edinburgh University, who used to say in his lectures that, provided he was called early in pneumonia, he would be contented to dispense with all other aids than those of the lancet and water-gruel. The time will also pass when alcoholic stimulants will be regarded as the sole or even the best remedies in pneumonia. Dr. Gregory had, no doubt, cases in his mind to justify his language of faith in the lancet; and Dr. Anstie gives us cases in equal justification of his free recourse to the brandy-bottle in prescribing for his pneumonic patients. The results of the extreme, if not exclusively, stimulating treatment in this disease are not calculated to win confidence and secure general imitation. There are still judicious practitioners who bleed in pneumonia, to the great relief of their patients, and who do not deem it inconsistent

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practice to stimulate at the same time, and in this way bring about a cure. They do not pledge themselves to bleed; they certainly do not stimulate in every case, to the exclusion of a modified treatment. Sound conservative medicine is, we believe, fairly represented on this point in the lecture (XX.) of Dr. Chambers on "Pneumonia." It begins by relating three cases of the disease. 1. Frank, uncomplicated double pneumonia in a temperate man with excessive dyspnœa. Cured with venesection, jacket-poultice, continuous feeding, and wine. 2. Pneumonia of upper and lower lobes of one lung, very slight in the other lung, in a broken-down old man. Cured with cupping, jacket-poultice, continuous feeding, and wine. 3. Congestive pneumonia of lower lobe in typh-fever. Cured with half-jacket poultice, cupping beneath scapula, continuous feeding, wine, and bark. Dr. Chambers describes the symptoms of the first case. Age of the patient, 21 years; lips and tongue livid; pulse very quick and small, but the heart beat strongly, in spite of its great rapidity. The expectoration was copious and glairy, of a deep tawny color, and with a few small striæ of blood in it. The state of the lungs, ascertained by auscultation and percussion, is given. "It was obvious that active inflammation raged throughout nearly the whole (if not quite the whole) of the right lung, and in the lower lobe of the left, and that it was most advanced in the back part of the right side. At most, a third of the pulmonary tissue was in working condition, so no wonder that exaggerated puerile breathing was heard in that third, and the ribs were heaved in an extraordinary manner when heaved at all." This man was brought to the hospital six days after his seizure, his case marked by severe rigors, followed by a dull pain in the side, and cough. The treatment after his reception is thus described: "The patient was bled to three-quarters of a pint from the arm, took eight ounces of port wine during the twenty-four hours and beef-tea every two hours, and had his chest completely enveloped in a thick, hot linseed-meal poultice. He was ordered, also, three effervescent draughts of citrate of ammonia daily." Relief began immediately after the venesection. The treatment was completed by the administration, from the eighth day, of decoction of bark. The second case was that of a man sixty-three years of age, suspected of "petty tippling." His pulse was large, short, and empty. His tongue was thickly furred and clammy, his hands tremulous, and his manner excited. There was also occasional delirium. On the fourth day of the disease he was sent to the hospital, where he

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received the following treatment: "He was cupped that day to six ounces on the cardiac region, and on the morrow to the same amount beneath the right clavicle. The chest was completely enveloped in a jacket of linseed poultice. He was ordered eight ounces of port wine every two hours, and three effervescing draughts daily of carbonate of ammonia and tartaric acid. After a fortnight's stay in the hospital, he began to take bark and ammonia. The third case was that of a youth aged seventeen years, who, on the third day from his seizure, presented the most unfavorable appearances—complete prostration and constant delirium; tongue clammy and tremulous, protruded with great difficulty from the dry lips; the pulse 120 and small; the skin hot and dry; the eyes were bloodshot, and on the front of the body were from thirty to forty fever-spots of various hues, some slightly raised and inclining to rose-color, some livid, some completely purpuric, and not changed by pressure. He was treated," says Dr. Chambers, "in my usual way, with hydrochloric acid and tepid sponging, and was going on as usual very well till May 3, the tenth day of the disease, when some fine crepitation and dulness on percussion were found in the lower lobe of the right lung, accompanied by slight cough, but without expectoration. On the 4th he was cupped beneath the right scapula to four ounces, a poultice was applied over that part, and he was directed to be kept turned on the left side." On the 7th the percussion was normal, and the breath-sounds, for the most part, healthy. The convalescence was rapid under bark and wine.

In farther remarks on bloodletting in pneumonia, Dr. C. states that the best guide for its necessity is dyspnœa, and we are told to be careful to supply material in the place of that which we take away by this operation. "Let the patients be fed with beef-tea or milk every two hours, just as if we had typh-fever. This is to be done in all severe cases, irrespective of other treatment." Alcohol, we are told on the same authority, especially in the form of port wine, is very useful in treating pneumonia. "Even to hearty temperate persons, when we are going to bleed, it is desirable to give a little wine, as was done in Case I. A glass of hot negus before the operation makes it safer." Whenever the nervous system is becoming prostrate we may give a little wine from time to time. Old persons, especially of the wealthier classes, who have indulged freely in alcoholic liquors, may begin wine immediately. "Children, on the other hand, get well quicker without it." In the

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administration of alcohol under any form, a rule directly opposite to that which governs the giving of nutritious food should be observed. The frequent repetition of small doses is specially and repeatedly objected to by Dr. Chambers. He always prefers two or three doses a day, enough at once to produce a decided effect. In the case of a young girl aged sixteen, taken with typh-fever and supervening pneumonia, the only additions to the usual treatment of the former disease were six leeches beneath the shoulder blade, a jacket-poultice, and ten grains of compound kino powder, three times a day during the first day, to check diarrhœa. The combination of alcohol and opium, with local detraction of blood, and nutrients, was successful in the case of a laborer, twenty-eight years, seized with pneumonia. Six leeches to the side one day, and sixteen more on the next, with a jacket-poultice, was followed by the use of ten minims of laudanum every four hours, six ounces of port wine daily, and a teacup of beef-tea hourly. Dr. Chambers thinks the opiate treatment of pneumonia is especially suited to cases where there is evidence of deficient power in the nervous system—great prostration, or tremor of the hand and tongue. He gives it, also, where the tongue has a smooth, whitey-brown, paper-colored coat, and where there is diarrhœa, or even tendency to diarrhœa, such as two fluid motions daily, for, in pneumonia, "of all unfortunate complications there is none so bad as looseness of bowels; those patients always do best who are constipated either naturally or artificially." As farther illustrating the good effects of local bloodletting with the use of laudanum, is another case related by the same author, of a young girl who had just reached the age of puberty. "On admission, the breathing was very labored, and she raised the *alæ nasi* in inspiration. The respirations were forty-four in the minute, and the pulse one hundred and forty-four. There was bronchial breathing and whistling rales all over the chest. The whole of the right lower lobe was dull on percussion. No stitch in the side, or pain on pressure. She was cupped to ℥iv between the shoulders, eight leeches were applied beneath the shoulder blades, and the chest was enveloped in a jacket-poultice. I also ordered her ten minims of laudanum every three hours, and teacup diet." In a case of pneumonia occurring in a muscular laborer, aged thirty-two years, who had been a hard drinker, and had had several attacks of delirium tremens, and on his admission exhibited a pulse of one hundred and forty, and respirations sixty in the minute, cupping to the extent of ℥viij was practised beneath

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the shoulder blades, a jacket-poultice was applied, and twenty minims of laudanum every four hours, and a teacup diet every two hours. In reference to the convalescence in this case, the lecturer points out the fact of the gradual progress of textural change in the lungs in pneumonia, and the gradual recession in its disappearance.

It has been seen that an almost uniform part of the treatment of pneumonia by Dr. Chambers consists in his directing the use of a warm thick linseed poultice, to be applied around the chest as a kind of jacket. He says, this is "another direct restorative, about the use of which also any when and any where you need have no manner of hesitation. You can always, without any exception of age, sex, condition, cause, or complication, follow a treatment to which I attribute more power of saving the lives of pneumonic patients than to any other, and which you see me apply in all cases." Under the use of the linseed poultice the dyspnœa is diminished, the breath being easily drawn in spite of the weight of the poultice; the hot fevered skin becomes moist and active, and soon the ribs begin to move again and air is admitted into the hitherto paralyzed lung-tissue. To the infant who cannot afford much loss of blood, this remedy is the really safe and invariably necessary one.

"The poultice is best made of linseed meal, because that keeps moist the longest. It should be spread half an inch thick on a cloth or flannel as broad as the circumference of the thorax. If any portion of the upper lobes be inflamed, it is essential, and if even only the lower lobes are inflamed, it is prudent that the poultice should be deep enough to cover the whole chest from the collar bones to the hypochondria. Lay the patient in it on his back, and fold it across the front till it meets. In adults it will usually keep its place of its own accord; but in children you should have a tape stitched on in front and a tape behind, which you can tie over the shoulder in the manner of a shoulder strap; otherwise the little prisoners wriggle out of their soft breast-plates. When once you have got this jacket poultice *in situ*, keep it there, and desire the nurse, on pain of dismissal, never to take it off till another hot one is ready to go on. The poultice in low fever often takes the place of sponging by its softening and suffusing with a gentle perspiration the whole body."

Dr. Chambers, in referring to his refusing the very urgent request of a patient laboring under *emphysema of the lung*, for beer,

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adds: "I hope, if probable, to break him of the habit, for nothing is so injurious to regenerative tendencies as alcohol, and no form of alcohol liquid so bad as beer." But he corrects himself by making "one exception to the bad pre-eminence of alcohol, that is, mercury. Avoid mercury in these cases as you would a poison. Avoid also purgatives."

A case of *pericarditis* occurring in the course of acute rheumatism—quite a common event—was treated by Dr. Anstie as follows: The patient, aged eighteen years, had been in homœopathic hands for four days. He took one grain of morphia every four hours throughout the persistence of the chest symptoms, and for seven days twelve ounces of gin each day, and about an equal quantity of water, two drachms of the gin being given every half hour. For a while gin and water was the only thing the stomach did not absolutely reject at once. "Recovery in this case was very rapid, for the man was able to get about in a month." Dr. A. generally recommends in this disease repeated small doses of alcohol. Dr. Bennett treats acute pericarditis according to the general and, as seems to us, rational principles which govern him in prescribing for other phlegmasiæ and fevers. During the acute febrile symptoms, salines and quietude. If there be much local pain, leeches and local warmth. If there be excited action and dyspnœa, ether and morphia, and, as early as possible, nutrients and wine to support the vital changes which it is necessary for the exudation to go through, so as to favor absorption. Active purgatives should be avoided; and blisters are thought to be of doubtful value. Dr. Chambers, in prescribing for pericarditis, makes no mention of alcohol. His chief reliance is on leeching early and repeating opium and poultices. He speaks highly of enveloping the patient in blankets. As a palliative to relieve some of the many unpleasant and often very painful symptoms in chronic pericarditis, alcohol is frequently given. Of its curative power nothing can be said, especially when occurring, as it so often does, after Bright's disease, a product of alcoholism. Dr. Stokes[1] thinks that our great reliance must be on the free use of wine or brandy in confirmed cases of *fatty degeneration of the heart*, where the patients have always been temperate, and, above all, where the pulse is slow, with tendency to faintness or to attacks of pseudo-apoplexy. By such a course alone can we hope, in the opinion of the author, to

[1] Diseases of the Heart and Aorta.

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preserve or prolong the patient's life. "Cardiac suffering" from the use of tobacco and excessive drinking of green tea is relieved by similar means. The same remark is made to apply to the treatment of *hypertrophy of the heart*, with passive enlargement of the organ, or with permanently patent aortic valves. It must be borne in mind, however, as we have already stated, that fatty degeneration of the heart will probably acknowledge the large use of alcohol for its chief cause, although the disease may, as in the cases specified by Dr. Stokes, occur in a temperate person. Dr. Chambers, with his usual discrimination, says in reference to the treatment of "disease of the heart" (Lect. XXV.): "While you bid your patients live generously you must take care to disabuse them of the notion that the advice includes excess in alcohol. Alcohol is really the most ungenerous diet that there is. It impoverishes the blood, and there is no surer road to that degeneration of the muscular fibre which is so much to be feared. And in heart disease it is more especially hurtful, by quickening the beat, causing capillary congestion and irregular circulation, and thus mechanically inducing dilatation of the cavities. Let the alcoholic drink be limited to that quantity which increases the appetite. In a great many instances this quantity may be very shortly written down—0."

The *convulsions of teething* are arrested by the use of alcohol in a remarkable manner, according to Dr. Anstie. He has found no other plan of treatment so beneficial. "There is not," he says, "the least necessity for intoxicating the little patients; a minute dose of wine or brandy (for young infants a few drops at a time in a little water) is amply sufficient for any good purpose that can be effected." Many will ask whether a better purpose would not be effected by a substitute for a remedy which is so liable to be abused and made a source of such great and abiding mischief. The mother, let us suppose, finds alcohol good in the convulsions of her child from teething; she will be very apt to give it to allay the irritation and restlessness accompanying this process. An occasional starting in sleep will alarm her, and for fear of convulsions she will give her child alcohol, and if she has any hysterical twitches herself she will believe that alcohol, even without the thoughtless advice of a physician, may be of service to her also. In fine, if alcohol finds a recognized place in the nursery dispensary, the foundation for a love of it on the part of the poor infant is laid, which grows with its growth and strengthens with its strength. This is no imaginary fear. There are safer and better anæsthetics in infantine convul-

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sions than alcohol in any shape. Excellent results are claimed by Dr. Anstie for alcohol in some cases of *tetanus*. This treatment is familiar to every physician, and has long enjoyed a certain amount of vogue. Alcohol has, also, been given in *hydrophobia* and in *snake poisoning* in large and intoxicating doses with, in some cases, satisfactory effects.

In the *exhaustion and syncope from hemorrhage* recourse is had to brandy and kindred liquors in large doses, and often without due discrimination. When the hemorrhage has ceased, or in cases of exhaustion termed shock, from external injury or from mental cause, the desired reaction is obtained by a moderate quantity of strong alcoholic liquor. Dr. Young contests the propriety of giving alcohol under such circumstances, on the ground that this substance is not a stimulant to the heart, but rather an enfeebling agent and one that diminishes animal heat, as shown by the experiments of Dr. N. S. Davis, of Chicago, and others previously named. Dr. Young from his own extensive experience, as surgeon in the army and in private practice, is led to believe that alcoholic liquors retard the reaction and increase depression, and he has, in consequence, long since avoided their administration. He substitutes for them hot coffee, hot teas, and hot broth, when obtainable, and he has been much better pleased with the effects of these beverages. For the long list of disorders of the digestive organs and those of the nervous system so often associated with and resulting from them, alcohol is freely prescribed, often thoughtlessly by the physician, and still more freely drank, for the most part with appetite, but in ignorance, by the patient. The most obvious and abiding consequences of this extensive and uncalled-for practice are often aggravation of the disorders which it was meant to remove, and often, O how often, habits of intemperance in its varied and distressing varieties, of which so many persons of all ages, ranks, and professions, and both sexes have been the victims. Many a drunkard, says Dr. Wood,[1] owed a miserable death to the inconsiderate recommendation of a little brandy in dyspepsia. Whence, we would ask, comes the advice? where rests the responsibility? The evils are the more deplorable as they might easily have been prevented, for, it may be safely and truly said, that in all dyspeptic and nervous troubles there is not a pain or an ache or an unpleasant sensation, or depression of spirits, or wakefulness, that cannot be

[1] Therapeutics and Pharmacology, vol. i. 671-2.

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relieved by other remedies and agents than alcohol, and their recurrence prevented by an amended system of dietetics, in which alcohol finds no place. A reform in this matter requires on the part of physicians when they become advisers the exercise of thought, patience, firmness, knowledge, and sound ethics, which look to the consequences of an indulgence beyond the hour of its gratification. Medical men will be slow to admit that they are wanting in these requisites, for the exercise of which every community must look hopefully to them more than to any other class. Ingenious paradox must yield to a plain statement of facts. Dr. Rush, speaking from his own extensive observation and experience, gives his warning when he tells us that "valetudinarians, especially those who labor under disorders of the stomach and bowels, are very apt to fly to spirits for relief. Let such people be cautious how they repeat this dangerous remedy. I have known many men and women of excellent character and principles who have been betrayed by occasional doses of gin or brandy to ease the colic, into a love of spirituous liquors, insomuch that they have afterwards fallen sacrifices to their fatal effects. The different preparations of opium are a thousand times more safe and innocent in all spasmodic affections of the stomach and bowels. So apprehensive am I of the danger of contracting a love for spirituous liquors, by accustoming the stomach to their stimulus, that I think the fewer medicines we exhibit in spirituous liquors the better." Brandy, says Dr. Chambers in commending the remedies for eructation and vomiting, useful in teaspoonful doses in acute cases, is obviously not adapted for chronic disease. In our medical studies and reading we are too apt to skip the beginning in our eagerness to reach the great object before us, viz., the cure of disease. We are not fully aware of the fact, that it is of far more importance to know how to prevent than how to cure a disease, even had we the power of always curing instead of being so often baffled in our attempts in this way. Prevention works on a large scale, therapeutics act on a limited number of individual cases. A careful study of the Materia Alimentaria ought to precede that of Materia Medica, and in that case the student would learn what are real alimentary principles and what are fictitious ones. He would see that water is a true primary alimentary and vital principle, indispensable in health and a safe ally in disease; it is restorative, exhilarating, strengthening, forming the larger part of the blood and other fluids and the tissues, entering freely into the organism and escaping as

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freely, and not like alcohol which is introduced as an admitted stranger and hurried out like a smuggled article as rapidly as possible, and leaving behind it a very equivocal reputation if not positive proofs of its disorderly and destructive nature. Dr. Anstie, in the work already quoted, relates several cases of persons of both sexes who lived for a length of time on alcoholic drink, chiefly distilled spirits with a very slight addition of real solid food. One old man, eighty-three years of age, it is stated, had taken nothing for a number of years but gin to the amount of a bottle a day, with water and a small finger length of bread. The chief witness of the truth of the story in this case was the old man's daughter, and we may be allowed to doubt its literal accuracy. No notice is taken of the quantity of water he was in the practice of drinking between his gin potations; and it must be remembered that absolute alcohol could not be drank at all without the addition to it of water, as we meet it in distilled spirits; it is still alcoholized water that is taken, for in its pure state alcohol could not enter the circulation without its causing acute poisoning. It is to be deeply regretted that our profession at large is not more thoroughly imbued with the truth of the fact, acknowledged by some of the greatest names in medicine, that water is the most salutary and sustaining drink in health, and among the foremost remedies in disease. The "watery regimen," which includes both the internal and external use of water, would furnish a theme for investigation by the American Medical Association most prolific of instruction in a hygienical as well as therapeutical point of view, and would prove the best corrective of alcoholic drinking that could be devised. The materials for the purpose are abundant. When a more active medicinal agency is required it will be readily found in the varied sanitary and curative constituents of the waters of mineral springs, combined in nature's laboratory by nature's pharmacy, and enabling us to meet nearly every indication for the cure of disease in every form.[1]

[1] The writer of the present report, at the approaching termination of a long life of professional and literary toil, may hope to escape the imputation of obtrusive vanity of authorship, if he refer now to some of his contributions to these subjects, as, for example, on Baths and the Watery Regimen, on Mineral Springs, etc. The *British and Foreign Medico-Chirurgical Review*, never lavish of its praise, said, soon after the first appearance of the volume on Baths, etc.: "The work by Dr. Bell is the most complete monograph, we do not hesitate to say, ever issued from the press, and should find a place as a work of reference in the library of every practitioner."

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Little can be said in favor of alcohol in the treatment of chronic diseases. Too much is of necessity forced on our notice of its deleterious agency in the production of many diseases of this class, as we have had occasion to indicate in this report, to allow of our putting any faith in its curative power under these circumstances. Some physicians have been sanguine enough, of late years, to believe that an exception favorable to alcohol will be found in its use in pulmonary consumption. It could hardly have been supposed on any theoretical or indeed pathological grounds that a degradation of tissues and exhaustion from impeded and imperfect nutrition so often caused by alcohol, would be any protection against the formation of tubercle, or a means of restraining its growth in a subsequent stage. But such would seem in some cases to be the fact, looking at the not unfrequent exemption of drunkards from phthisis. It is going too far, however, to convert this escape into a general proposition. Every practitioner must have met with consumptive drunkards; and it remains to be seen how far drunkards by their original constitution and temperament, and descent from non-phthisical parents might expect to escape from this disease, even while indulging in habits calculated to bring it on. For the present we believe that the profession must accept the conclusions reached by Dr. John Bell of New York in his elaborate Fiske Prize Essay.[1] They are—

1. That alcoholic drinks have a marked influence in preventing the deposit of tubercle, is destitute of any solid foundation.

2. On the contrary, their use appears rather to predispose to tubercular deposition.

3. When tubercle already exists, alcohol has no obvious effect in modifying the usual course run by that substance.

4. Neither does it mitigate in any considerable degree the morbid effects of tubercle upon the system in any stage of disease.

Professor Davis' observations have led him to a disbelief of the prophylactic power of alcohol to ward off phthisis. Apposite to the present argument, and in favor of the negative side, is the result of observations made by Dr. Marcet, of 695 out-door hospital patients to ascertain the extent of the predisposition to diseases from alcohol. We made free use of this writer's paper under our head of etiology, and among others of his conclusions which pointed to the fact of drinkers being much more predisposed to diseases of the

[1] Published in Am. Journ. Med. Sciences, 1859.

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respiratory organs than those who are sober, and that this predisposition was still greater in laryngitis. We may now add, in reference to particular employments, that drinking shop-keepers are much more predisposed to pulmonary affections than sober shop-keepers. A similar difference was observed between drinking engineers and sober engineers.

Doctor Chambers holds the opinion (Lect. XXIII.) that alcohol is not only useless but injurious to the consumptive, excepting for its beneficial action upon the mucous membrane, as when added to cod-liver oil to enable this latter to be absorbed more rapidly. Alcohol, continues the lecturer, "arrests and obstructs the vigor of vital action; by it growth is checked, as we see in animals artificially kept small by dosing with alcohol in youth, without a sufficient supply of food, and in men who have early in life habitually indulged in ardent spirits. Under its use renewal goes on slower, as we know by the diminished excretion of urea, water, bile, etc. (see Dr. Boecker's Experiments and Lecture L. in this volume), and we can hardly therefore expect it to be advantageous where the continual renewal of vital powers is our primary object!" Sometimes where the alcohol, acting as an anæsthetic, seems to check the disease and relieve the symptoms, it "has acted merely as a mask behind which the evil has gone on unawares." The lightening of the symptoms "is merely a misty cloud of anæsthesia which stands between the patient and his pain, and I doubt if life is prolonged." How universally applicable are these remarks to the delusive action of alcohol in all chronic diseases!

MEDICAL JURISPRUDENCE.

In its Relations to Alcohol.—Alcohol introduces its customers to a great variety of places and company which are far from being of the most agreeable kind. It brings some to the station-house or lock-up, to spend the remainder of the night; some to the almshouse or to the prison, to spend there the remainder of their days; others are carried to the hospital; and others, again, to a lunatic asylum. Some it introduces into courts of law, to have it determined how far a thoroughly alcoholized man is capable of continuing to take charge of his property, or is responsible for acts of fraud, or of violence on his fellow-creatures. These are questions for medico-legal investigation, into which we cannot be expected to engage on the present occasion beyond a mention of

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some leading points. For a regular array of arguments and applied cases, we would refer to the standard works on the subject.[1]

As regards a drunkard's tenure of property, reference may be made to a case cited by Lord Eldon, where a commission of lunacy was supported against a person who, when sober, was a very sensible man, but, being in a continual state of intoxication, he was incapable of managing his property. By the Roman law a notorious spendthrift was put under guardianship; and by the law of Scotland, a man who from drunkenness, facility of temper, or any other cause, is liable to be stripped of his property by the necessitous or designing, has the power of putting *himself* under trustees, without whose sanction no act of his can be valid. This is technically called *inhibiting one's self*. In the State of New York there is a statute which places the property of habitual drunkards under the care of the Chancellor, in the same manner as that of lunatics.[2] Any deed or agreement made by a party while drunk is not invalidated by the English law.

Drunkenness is not held to be an excuse for homicide; or, stated in other words, "insanity immediately produced by intoxication does not destroy responsibility where the patient, when sane and responsible, made himself voluntarily intoxicated." Drunkenness, so long as it does not prostrate the faculties, cannot be distinguished from any other kind of passion. There is still less excuse for the former state than the latter, inasmuch as in many, if not in all cases of murder committed by a drunkard, the guilty man wrought himself up to a state of mind to make him dare to do the deed by previous drinking to the extent of producing partial if not complete intoxication. The tenor of common and civil law to this effect is clear. Sir E. Coke most emphatically declares, that, "as for a drunkard, who is *voluntarius demon*, he hath, as been said, no privilege thereby; but what hurt or ill soever he doeth, his drunkenness doth aggravate it." In our own day, Judge Parke, a very authoritative crown judge, said to a jury

[1] Medical Jurisprudence of Insanity, by I. Ray, M. D.; Elements of Medical Jurisprudence, by Theodoric Romeyn Beck, M. D., and John B. Beck, M. D., revised by C. R. Gilman, M. D.; Treatise on Medical Jurisprudence, by Francis Wharton and Moreton Stillé, M. D., medical part revised and corrected by Alfred Stillé, M. D.; Medical Jurisprudence, by Alfred Taylor, M. D., with Notes and References by Clement B. Penrose.

[2] A similar law was passed in Pennsylvania in 1819, and in New Hampshire in 1822.

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in 1833: "I must also tell you, if a man makes himself voluntarily drunk, it is no excuse for any crime he may commit while he is so; he takes the consequences of his own voluntary act, or most crimes would go unpunished." The law in our own country is that drunkenness is no defence to the fact of guilt; the only point about which there has been any fluctuation of opinion being the extent to which evidence of drunkenness is receivable to determine the exactness of the intent, or the extent of deliberation. A person laboring under *delirium tremens* is declared to be irresponsible, as in this case drunkenness is the remote cause of what may be considered actual insanity. When delirium tremens is set up as a defence, the prisoner must show that he was under a delirium at the time the act was perpetrated. Judge Story has said: "The law looks to the immediate, and not the cause which remotely produced it. Many species of insanity arise remotely from what, in a moral point of view, is a criminal neglect or fault of the party; as from religious melancholy, undue exposure, extravagant pride, ambition, etc.; yet such insanity has always been deemed a sufficient excuse for any crime done under its influence." The state of mind here represented must not for a moment be confounded with drunkenness *per se.* The same enlightened and learned judge just quoted tells us that insanity is not a competent excuse for crime, if it be committed "while the party is in a fit of intoxication, and while it lasts." Involuntary drunkenness, as where a person is ignorant of the readiness with which it may occur, or the mental disorder produced by it, or where he is made drunk by his companions, will be received as an excuse or in mitigation of criminal acts committed in this state. An irresistible propensity to excessive drinking is to be regarded with some indulgence, and as not so much a cause of insanity as one of the first or preluding symptoms of this disease. This propensity shows itself, and seeks for its indulgence at intervals, and in the paroxysms of drunkenness thus brought on, Esquirol looks on the person at the time as a true monomaniac, and not morally responsible. Crimes committed in the lucid intervals between these paroxysms, or of attacks of delirium tremens, do not stand excused on account of the state of mind of the prisoner during the actual disease. The following case in one of the New York courts bears on this point. Thomas Harty, the prisoner, was addicted to drinking spirituous liquors. He resided in Albany during the winter of 1832–3, and while there had several paroxysms of delirium tremens, which were of

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short duration. In the spring he removed to Troy. On the 31st of August he murdered his wife by a blow with an axe. He had for three weeks previous to this period exhibited no marks of insanity. Some ten days previous to the homicide he had ill-treated his wife, and for a few days she refused to live with him; but at length returned home. After the deed was done, his actions and conversation induced some persons to think he was insane. But the most intelligent individuals, who conversed with him, did not consider him so. And there was no proof of insanity or delirium tremens either on the morning on which he killed his wife or for several months before. He was executed for murder.

The light in which the English law regards drunkenness, in relation to responsibility for crime, is shown in the legal admissibility of confessions made in this state. In a particular case, the prisoner confessed, while drunk, that he had committed a robbery and murder, which had taken place some time before, but of which he had not been suspected. He mentioned a spot where the property of the murdered person had been concealed by him, and the whole of the circumstances of the murder. The property was found as he had described, and the case clearly brought home to him, chiefly by collateral evidence from his own confession. He was convicted.

We have yet much to learn respecting the psychology of alcoholism, of which drunkenness is made the chief feature, but it is not always the most characteristic one. There is a condition of the nervous system, and a corresponding frame of mind, especially of the affective faculties in the habitual drinker, preceding and following a paroxysm, as it may be called, of drunkenness, which, if it does not bode mischief as much as this latter, is, notwithstanding, a perilous one both for its possessor and for other persons with whom he is brought in contact. Destructiveness and combativeness are more roused in a fit of drunkenness than at other times; but the darker and more malignant passions of hatred, envy, revenge, cool and collected cruelty, and treachery, with an exalted but perverted imagination, are at work under alcoholic promptings and poisoning, in a less demonstrative but more determined and persistent manner. In this poisoned and perverted state of feeling the most horrid crimes are committed, their perpetrators not requiring to be worked up to the pitch of intoxication, but impelled by some alleged mysterious influence—"a voice from heaven," "a spirit whispering to them," etc. In their intercourse with those

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around them they are moody, sullen, and morose in manner, and scant in speech, as if absorbed in meditation. They are, in fact, less of free agents than the boisterous drunkard, and require as careful watching as the more distinctly recognized insane.

JOHN BELL,
Chairman of Committee and Reporter.

April 27th, 1868.

NOTE.—With the abundant supply of matter and copious references, together with previous handling of the subject committed to him and his associates by the Association, the author, although going over much of the same ground with Dr. Carpenter, in his excellent Prize Essay on the "Use and Abuse of Alcoholic Liquors in Health and Disease," has not found it necessary to make the use of this work which, with more space at his disposal, he would otherwise have done. More than thirty-eight years have elapsed since the author first gave his own creed of total abstinence from all intoxicating liquors, and adduced a large body of evidence in its favor in the Anniversary Report which he prepared and read for the Managers of the *Pennsylvania Temperance Society*, May 27th, 1831. From this document he has drawn freely on the present occasion. He has to regret not to have seen Dr. Wilson's valuable work on the "Pathology of Drunkenness." The author has been allowed to introduce some additional facts into the report since it was first presented to the Association, at its meeting in New Orleans.

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ON

WARM CEREBRO-SPINAL BATH IN CONGENITAL APNŒA,

AND ON

A NEW METHOD OF ARTIFICIAL RESPIRATION.

BY

E. D. McDANIEL, A. M., M. D.,

OF CAMDEN, ALA.

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ON WARM CEREBRO-SPINAL BATH IN CONGENITAL APNŒA, AND ON A NEW METHOD OF ARTIFICIAL RESPIRATION.

THE labors of Edwards and of Marshall Hall led those distinguished men to the belief that a reduction of temperature below the ordinary standard of health in mammals puts them in a condition approaching that of hybernation and of cold-blooded animals, and thus enables them to endure much longer and better the abeyance of oxygen and the respiratory function.

Dr. Marshall Hall, with this belief, very plausibly and earnestly condemned the early employment of the warm bath, as recommended by the Royal Humane Society, in the treatment of drowned persons and of asphyxia from other causes. He admitted that a newly-born infant might be, before the function of respiration was inaugurated, more tolerant of the exclusion of air, and of the presence and even accumulation of carbonaceous and azotic impurities in the blood, and might therefore be less injured by measures that raise or sustain the temperature above 60° Fah.; still he taught as a broad rule in the treatment of apnœa, in infants as in that of adults, to abstain from the warm bath until after the establishment or restoration of respiration. He did not deny that the bath would stimulate nerve-action. He admitted that it would stimulate the circulation, and, with it, would accelerate those intimate parenchymatous chemical physiological processes which consist largely in the action of the atmospheric ingredients on the fluids and tissues, and which result in the formation of the excrementitious blood-poisons. But his *great* objection to the warm bath in cases of apnœa of newly-born infants was that it was incompatible with the use of his "ready method" of artificial respiration, and thus was indirectly or negatively hurtful by interfering with the use of a more effective measure.

It seems to me that the teaching of the Royal Humane Society in regard to the warm bath was founded on long and general obser-

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vation, and that that of Marshall Hall rested more on an inference made on theoretical grounds, and supported by rather too few confirmatory facts. There seems, at least, to have remained, despite the ingenuity, authority, and plausibility of Hall's reasonings, a certain general impression of the valuableness of the bath, and a general reluctance to throwing it aside. That such a reluctance and impression obtained is signified by the fact that Dr. Sylvester claimed it as a special advantage of his "Method" that it did not preclude or repudiate the use of the bath; and by the fact, in addition, that this claim has been widely and warmly received, as evidenced by the popularity of his method.

Now, that any considerable acceleration of the processes of internal oxidation or any *dangerous accumulation of their carbonized blood-poisoning products*, can, as alleged by Marshall Hall, take place *before any supply of oxygen has commenced by the establishment of respiration*, and merely from the apparently inadequate supply previously derived from the mother, and subsequently received through the skin, is highly improbable. Such an accumulation would hardly take place in the brief time ordinarily intervening between birth and the establishment of respiration. We may, however, easily avoid even the possibility of any such danger and still retain the advantages of the bath. We may reconcile the advocates of the warm bath and its opponents. We have but to apply the bath to the posterior of the body, and leave the anterior out.

This constitutes our proposed "occipito-spinal," or "cerebro-spinal bath." It promotes nerve-action, and thereby respiration, by improving the circulation in the cerebellum, medulla oblongata, and medulla spinalis; while it adds little or nothing to the temperature and physiological changes of the great mass of the fluids and soft tissues which are in the anterior of the body, and which may, if need be, have their temperature regulated by appropriate means. At all events, I have, for many years, used this "cerebro-spinal bath" in conjunction with a new method of "artificial respiration," and have had very gratifying results, *especially* in cases occurring in very weakly and in prematurely born children. In such cases, the effect of restoring the lowered temperature of the occipital, cervical, and dorsal regions—that is, of the regions about the roots of the nerves presiding over the respiration—has often been so prompt and powerful as to surprise and greatly delight me, and has fully convinced me of the propriety—nay, the necessity of

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keeping up the external supply of caloric until respiration, the great internal source, becomes established. The warm bath is to the child after birth what the warm amniotic fluid was before birth, and should be of about the same temperature. In very hot weather, the warm bath is, of course, not needed, and cooling measures may even become necessary. Sudden shocks by cold, as by slopping with cold wet cloths, or by springing upon the infant jets of cold water or of spirits from a Davidson's syringe, may be eminently serviceable; but prolonged cold is improper. When no bath, either warm or cold, is deemed necessary, the skin should be kept moist so as to favor cutaneous respiration.

In proposing a new method of "artificial respiration," I beg leave to call attention to the fact, that in all the "methods" heretofore presented, the patient is placed in the *horizontal position* except in Sylvester's, in which the chest and shoulders are *slightly elevated,* whereas, in cases of orthopnœa the patient instinctively and hurriedly avoids the recumbent and assumes the sitting position, the reason of this being that the capacity of the chest—the so-called "vital capacity" of Hutchinson—is greater in the sitting position than in the recumbent. This greater "vital capacity" in the sitting position forms the rationale of the new method, which is practised as follows:—

The patient, as soon as the condition has been ascertained, and all fluids have been carefully removed from the mouth, fauces, and pharynx, is placed in a sitting position with head and chest leaning forward, as in cases of asthma and other forms of severe dyspnœa. The left hand of the operator is gently placed *open* on the back of the chest of the patient, and his right hand on the forehead. The head and chest are moved slowly and directly back considerably beyond the perpendicular, and the inspiratory expansion of the chest thus produced is augmented by such subsidiary movements of the operator's hands as will fulfil the remaining indications required. These indications are two: first, to assist the access of the air to the lungs, by diminishing the bend of the passage at the pharynx, and this is easily done by extending the head a little farther back with the right hand of the operator; second, to get rid of the weight of the arms, and to use the pectoral and intercostal muscles in increasing the expansion of the chest. This requires some adroitness, but may be accomplished by rotating the left hand on the centre of the palm as a fixed point, until the occiput of the child rests on the operator's left wrist, and the arms of the child

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may be elevated by the operator's right hand. All this requires no hurry, and completes the inspiratory movement. The expiratory movement is compassed by reversing all these manipulations, and, thereby, slowly moving the head and chest directly forward until it reaches the point or position at which the inspiratory movement commenced. One whole respiratory revolution is now finished. Fifteen or more such revolutions should be made per minute, and artificial movements simulating the natural respiratory expansions and contractions thus kept up until the patient is completely saved or all hope entirely lost.

When the warm "cerebro-spinal bath" is required in connection with this method (and in all prolonged cases it is required), a large wash-bowl with recurved sides will be found a most suitable vessel, as it may be conveniently introduced into the bed without disturbing the mother, before the child is separated by cutting the cord, and the inspiratory movement may be elegantly promoted by leaning the back of the child against the recurved convex inside of the bowl and the occiput a little over its edge. The operator's hands will then both be free and can be used to elevate the infant's arms and ribs. The occiput may also be easily slided down occasionally into the bath, and have its temperature and circulation thus improved. I have, as before intimated, practised this method for many years, and with such success that I greatly prefer it to any other. It is not at all unusual to see, after a faithful perseverance with the method, the first independent inspiratory movement take place twenty or thirty minutes after birth, and to have the case afterward do well. I remember one case in which the first inspiration took place thirty minutes after birth; another ninety minutes; another two and a half hours; and another four hours. We should, therefore, not be discouraged in cases that appear very hopeless.

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REPORT OF THE SECTION

ON

Anatomy and Surgery.

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REPORT OF THE SECTION

ON

ANATOMY AND SURGERY.

TUESDAY, May 4, 1869.

THE Section met at 3 P.M.

Dr. PAUL F. EVE, of Tennessee, was called to the chair, and Dr. J. F. HEUSTIS, of Alabama, appointed Secretary.

The only paper presented was a monograph on *Mollities Ossium*, illustrated with cases, by JOS. JONES, M.D., Professor of Chemistry in the Medical Department of the University of Louisiana.

There being no other business before the Section, it adjourned until 3 o'clock to-morrow.

J. F. HEUSTIS,
Secretary of the Section.

WEDNESDAY, May 5, 1869.

The Section met at 3½ P.M., pursuant to adjournment.

Dr. PAUL F. EVE called the meeting to order, and remarked that as the last meeting was not generally known, and attended by only a small number of the delegates, its action in the election of officers should be reconsidered.

On motion, the objections of Dr. EVE were overruled, and the action of the previous meeting, in relation to the election of officers, was sustained.

President of the Section, Dr. PAUL F. EVE, of Tennessee.
Secretary " " Dr. J. F. HEUSTIS, of Alabama.

Prof. EVE'S report on his *Canula Needle to be employed in the Operation for the Cure of Vesico-Vaginal Fistula* was referred to the Committee of Publication, with a recommendation that it be included in the *Transactions*.

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Dr. LEWIS A. SAYRE, of New York, presented, by request, the paper of Dr. WHITEHEAD, of New York, which illustrated by well-executed diagrams the mode adopted by him in *Operations for the Cure of Cleft Palate involving the Partial Destruction of the Palatine Processes.*

Dr. SAYRE remarked that the gist of the paper consisted in the recommendation of incisions antero-posteriorly, near the alveolar margin of the palate, and the inclusion of the post-palatine arteries in the mass of tissue to be used in closing the aperture.

Dr. MARCH, of New York, asked what effects resulted in regard to the improvement of speech, and also whether there was not exfoliation of bone after the periosteum had been detached.

Dr. DOUGLAS responded that the results were unfavorable in regard to improvement of speech, in which opinion Dr. SAYRE concurred.

Dr. FRISSELL, of West Virginia, stated that he had assisted in a number of cases where the operation had been performed, and in none had the speech been improved. Exfoliation is not apt to occur, because the bone is not cleanly stripped. He was not well satisfied as to the propriety of an operation, since the obturator (artificial) answered every purpose.

Dr. EVE remarked upon the experience of a scientific dentist in Nashville, who had been engaged to assist in the mechanical work necessary for such cases, to the effect that the results after operation had been so unsatisfactory in Europe, that the operation had been almost entirely abandoned.

Dr. HOLLOWAY opposed the reference of the paper to the Committee of Publication, because of the fact that it did not contain anything original; that the main points advanced in the paper had already appeared in either the *Medical Times and Gazette* or the London *Lancet* for this year. In regard to exfoliation of bone, he did not think the periosteum essential for the prevention of exfoliation, because of the various sources of blood-supply to bone.

Dr. MARCH stated that he had operated upon a number of cases, but the improvement of speech was not satisfactory.

Dr. FITCH, of Illinois, moved to refer the paper to the Committee of Publication without instructions. Whereupon the Chair stated that that Committee declined taking any responsibility.

Dr. BAYLESS, of Kentucky, moved, as a substitute for Dr. FITCH'S motion, that the Section pass over the paper informally; in other words, take no action upon it.

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Dr. SAYRE was satisfied that Dr. WHITEHEAD did not claim originality, but simply reported upon the best method of operating; that he was not opposed to its publication, although he had performed a similar operation fifteen years ago, in presence of Dr. STONE, of New Orleans. His position was a delicate one; he was not prepared to defend the paper, nor was he disposed to vote against its reference.

Dr. BAYLESS then moved that the consideration of referring the paper be postponed until the meeting of the Section on to-morrow afternoon at 3½ o'clock, which was carried without objection.

Dr. JONES' paper, the consideration of which was postponed yesterday, was presented by the President. Subject, *Mollities Ossium.*

The Secretary was requested to read the table of contents.

On motion of Dr. SAYRE a committee consisting of Drs. FITCH, of Illinois, BAYLESS, of Kentucky, and MARCH, of New York, was appointed, to examine the paper, and report to the Section on to-morrow in regard to its merits.

After remarks by Drs. EVE, SAYRE, and HOLLOWAY, complimentary of the earnest and honest labors of Dr. JONES in the cause of medical science, the Section adjourned.

JAMES M. HOLLOWAY,
Secretary pro tem. of the Section.

THURSDAY, May 6, 1869.

The Section met at 3½ P.M. Dr. EVE in the chair.

The Committee appointed to examine the paper of Prof. JOS. JONES, on *Mollities Ossium*, reported that they had carefully examined it and would cordially recommend it for publication.

On motion it was referred to the Committee of Publication.

On motion, the paper of Dr. WHITEHEAD was also recommended for publication.

A paper entitled *Remarks upon some Points referring to Success in the Operation of Vesico-Vaginal Fistula*, by W. SCHUPPERT, M. D., of New Orleans, was presented and read by himself, which was unanimously recommended for publication.

Drs. LOGAN, SAYRE, and BAYLESS spoke in praise and approval of Dr. SCHUPPERT'S declaration that after-treatment, particularly as concerned the retention of a catheter in the bladder, was unnecessary.

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Dr. EVE spoke of the case of ligature of the innominate artery presented before the Association to-day, and requested that a committee of three be appointed to report upon it.

Dr. LOGAN, in reply, stated that the case had already been reported by Dr. SMYTHE in a medical journal.

Dr. SCHUPPERT exhibited photographs of a woman upon whom he had operated for an osteo-enchondromatous tumor of the scapula, He had excised the entire bone, with preservation of a useful extremity. Also a photograph of a man upon whom he had operated for spontaneous dislocation of the hip-joint, with subsequent anchylosis; resection of both trochanters; recovery without much shortening of the extremity.

There being no other business, Dr. HOLLOWAY moved a vote of thanks to the Chairman and Secretary of the Section, which was unanimously adopted, and the Section adjourned.

J. F. HEUSTIS,
Secretary of the Section.

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MOLLITIES OSSIUM

(MALAKOSTEON, OSTEO-MALACIA, OSTEO-SARCOSIS, KNOCHEN-ERWEICHUNG, RACHITISMUS ADULTORUM. RICKETS, OR SOFTENING OF THE BONES IN THE ADULT).

BY

JOSEPH JONES, M. D.,

PROFESSOR OF CHEMISTRY IN THE MEDICAL DEPARTMENT OF THE UNIVERSITY OF LOUISIANA, NEW ORLEANS; ONE OF THE VISITING PHYSICIANS OF CHARITY HOSPITAL.

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MOLLITIES OSSIUM.

CHAPTER I.

HISTORICAL NOTES ON MOLLITIES OSSIUM.

THE peculiar condition of the bones, known as mollities ossium, is so rarely met with in the United States, that many experienced and aged practitioners have never seen a case; but one case was recorded in the largest American Medical Journal, during a period of thirty years from its commencement, and a careful examination of several of the largest American Medical Journals has added nothing to the list of cases; and even in the annals of European medicine we can scarcely find twenty-five well-marked examples.

It is doubtful whether the ancients were acquainted with this disease; we have been unable to discover in the works of Hippocrates, Paulus Ægineta, Aretæus, and other ancient writers, any observations which could be referred to mollities ossium.

If the statements of Sachsius and Petra à Castro are to be received as applying to this disease, it was known to the Arabs, under the name of Alachad and Alzemena, and was cured by Avicenna; some of the interpreters of Avicenna, however, regard the disease which he is said to have cured, as a paralysis of the limbs, rather than a softness of the bones.

Abbon, the monk, who lived in the ninth century, relates an extraordinary instance when a very large man was reduced by it to the diminutive size of a child. Abulsedda asserts that the body of the prophet Gatteb was without bones, so that his limbs could be folded up like a garment. Hollerius is thought to be the first medical writer who made mention of mollities ossium; he recorded the observation that there was a woman in Paris whose whole body was soft and flexible, and without solid bones. (*De Morbis Internis. Rara Quædam*, No. 7, 4to. Paris, 1609.)

John Baptist Morgagni, in his *Seats and Causes of Disease*, mentions several authors, as Fernelius (1500—1558), Ruellius Jacobus

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Hollerius, Gulielmus Fabricius Hildanus (1560—1634), Peter Borellus (1620—1678), Thomas Bartholin (1616—1680), and Daniel Protenius, who had recorded observations apparently referring to this disease, but it is difficult to decide the nature of the softening, whether the result of syphilis, cancer, or rickets!

The first unequivocal observation which Morgagni quotes is that of Gabrieli, who in 1688, in dissecting the bones of a matron, found them universally softened and flexible, the long bones being converted into a soft, reddish flesh, apparently without tenacious fibres. Morgagni also quotes a similar observation of Courtialis, on another woman, whose bones could be bent, and resembled fungous and soft flesh, impregnated with a bloody serum.

One of the earliest and most distinct accounts of the disease was given by Bauda, in 1665, who, in 1650, observed for ten years the progress of the disease in the case of a citizen of Sedan.

Saviard, in 1691, and Lambert, in 1700, published cases.

Morgagni describes briefly a case observed and related to him by Valsalva, about the latter part of the seventeenth century, although it was not published until 1760. This case of Valsalva was that of a woman who had completed her fiftieth year, and was attacked with a pain in the lower jaw, attended sometimes with so large a flux of blood, that it was intended to have restrained the discharge by the application of the actual cautery, if it had not ceased spontaneously. In a little time after the woman began to be troubled with pain in her bones; with which having long been afflicted, she began, as often as ever she was moved, to complain that all her bones were broken; and, indeed, those who stood by her are said to have heard a cracking in her joints at that time. To this symptom another was afterwards added, that the bones of the lower limbs began to be bent, as if they were made of wax, and to be in pain, even on the slightest motion. At length, in examining her body after death, the ossa innominata, the ossa femoris and tibiæ, and those bones that make up the arch of the cranium, were found to be flexible, just as if they were made up of pretty thick paper; on their surface they were spongy, and at the meditullium, in some places, carious. Morgagni afterwards saw these bones, for Valsalva had preserved them, and describes the oblong ones as curved into the form of an arch, and those that composed the vault of the cranium depressed into the figure of a plane.

Morgagni further records the interesting observation that all of them were of a very bad color, and small, because they could not

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be cleaned internally, giving an unctuosity to the fingers in handling them.

This observation, indicating that the bones had undergone fatty degeneration, has been confirmed, as we shall see hereafter, by more recent and extensive observations. This change was similar to that described by John Hunter, in the case of mollities ossium reported by Mr. Goodwin ("the component parts of the bone were totally altered, the structure being very different from other bones, and wholly composed of a new substance, resembling a species of fatty tumor, and giving the appearance of a spongy bone deprived of its earth, and soaked in fats").

Petit, Manchart, Platner, Haller, and others have recorded observations which might be referred to this disease; and Boerhaave mentions an instance in which a man who lived with his bones in a state of softness, and not without the most severe pains, had his bones after death similar to a pultaceous substance, like that which is prepared from bones in Papin's digester.

The case published by Sylvanus Bevan in the *Transactions of the Royal Philosophical Society*, in 1743; the case of Anne Elizabeth Queriot, of Paris, called also Madame Supiot, the details of whose history were given in England by Ambrose Hosty, by M. Morand, in England, and by Mr. Bloomfield; that of Mary Hays, reported by Pringle and Gooch, and several others, will be found recorded in the following pages:—

The Seats and Causes of Diseases Investigated by Anatomy; in five Books, &c., by John Baptist Morgagni, Chief Professor and President of the University of Padua. Translated by Benjamin Alexander, M. D., vol. iii. pp. 344–347.

Traité des Maladies des Os. Par M. Du Vernez. Paris, 1751. Tome 1. Preface V., p. 136.

Sachsius, In Schol. ad Obs. 37. A. 1. Dec. 1. Eph., N. C.

Avicenna, Vid. c. 2; Fen. 2, 1, 3. Can. Avicen.

Fernelius, De Addit. rer. Caus., 1, 2, c. 9.

Jacobus Hollerius, In adjectis, 1. 1. de Morb. Int. Raris quibusd, n. 7.

Hildanus, Cent. 1, Obs. Chir. 45, and Cent. 6, Obs. 74.

Borellus, In fine Epilog. additi, ad. Cent. 4, Hist. and Obs. Med. Phys.

Bartholin, Cent. 6, Hist. Anat., 40.

Prottenius, In Act. Med. Hasn., vol. 3. Obs. 24.

Gabrieli, Eph. N. C., Dec. 3. A. 2. Obs. 3.

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Gagliardi, Anat. Off. c. 2, Obs. 3.
Courtialis, Hist. de l'Acad. R. des Sc. Ann. 1700, Obs. 2.
Saviard, Nouveau Recueil, &c. Obs. 62, p. 274, 1702.
Valsalva—Morgagni, Epist., lviii. 4.
S. Bevan, Phil. Tr., vol. xlii. p. 488.
Petit, Mém. de la même Acad., A. 1722.
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CHAPTER II.

CASES ILLUSTRATING THE NATURE, PROGRESS, TERMINATION, AND ANATOMICAL LESIONS OF MOLLITIES OSSIUM.

My attention was directed to this singular disease by the following case—Miss Raney Drucilla Bozel—and after comparing this case with others, we thought that it would not prove an unprofitable task to bring forward such a collection of cases as would illustrate more fully than has yet been done, the main features of the disease. Such an inductive investigation of this rare disease appeared to be more especially appropriate, as the records of its history are scattered in fragments in journals and systematic treatises.

Case I. Miss Raney Drucilla Bozel, Nashville, Tennessee, October 1, 1868; was called by Mrs. Bozel to attend her daughter, Miss Raney Drucilla Bozel, age 18, of humble parentage, who had always lived in great poverty. At the present time the patient, Miss Bozel, together with her father, mother, and younger sister occupy a small room about ten feet square in a wooden building, erected by the U. S. Government during the war, at the foot of Fort Naglie; the entire family is supported chiefly by alms, the mother's

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attention being taken up principally with the care of her sick daughter, and the father being aged, feeble, and afflicted with an eruption upon the skin, and an indolent ulcer upon the back.

The father, mother, and Miss Drucilla, all present pale, cadaverous faces, resembling those who have long been subjected to the action of malaria.

Miss Drucilla was born in Bedford County, Tennessee, three miles from Shelbyville, in a healthy locality, and her mother states that she was a healthy child up to the age of five years, when they moved to Southern Illinois, and settled on an island in the river, opposite Paducah, Kentucky.

The island lay in Madison County, Illinois, between the Tennessee and Ohio Rivers, was low, and subject to overflow. The island was overflowed the year after the removal of the family, and at this time the lower part of the house was under water, and the house occupied by the family, as well as the surrounding grounds, continued damp during a considerable portion of the spring and summer; the freshet occurred in the month of May. Shortly after her removal to this low, malarious situation, Miss Drucilla, who up to this time was an active, healthy child, was seized with the *ague*, and suffered with it for *eighteen months*.

The softening of the bones commenced just after the freshet, and whilst she was suffering severely with malarial fever, and whilst the house and surrounding lands were damp, and covered with the river deposit. The bones of the leg first became painful; poultices appeared to relieve the suffering temporarily. Then the jaws were attacked, became painful, and both the upper and lower jaw upon the left side became carious, and have continued occasionally to discharge pus and small fragments of bone up to the present time. The diseased surface sometimes heals up, but breaks out again.

About three years ago the left arm began to lose its bone, and has apparently lost all the earthy matter of the humerus for the space of some five inches. The mother states that this loss of the substance of the bone was attended with great pain.

At the present time the middle portions of the humerus of the left arm have apparently disappeared, or been converted into a flexible cartilaginous mass, only about two inches of hard bone remaining at the upper humeral and lower ulnar articulations. The arm can be bent at right angles to the natural course of the humerus, and it can be twisted around its centre; and it feels in this portion like a mass of flesh. The forearm and hand of the left

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side present a natural appearance. The right humerus of right arm feels rough and enlarged, and is painful to the touch. Ulna of right arm apparently of natural length, but anterior portion projecting outwards, and the hand thrown inwards. Radius apparently destroyed, or converted into soft flexible material, throughout a considerable portion of its extent.

Right thigh and leg much less affected than the left. Knee-joint of right leg much swollen, with distinct veins; ankle-joint much deformed, the fibula projecting beyond the ankle, and the lower portion of the tibia converted into soft, flexible material, shortened and diminished in size. The marks of several ulcers are visible upon the right leg.

Left leg—tibia and fibula divided or absorbed in the region of the upper third, and large masses of a hard nature—like the callus of the fractured bones in healthy individuals—have been thrown out around the extremities of the bones. Her mother states that this bone was fractured at night, whilst the patient was lying in bed, and that the fracture was attended with an audible snap. If the statement was correct, the fracture was occasioned by the action of the muscles of the thigh, after the weakening and absorption of a large portion of the shaft of the bone. The correctness of the statement is sustained by the existence of callus around the extremities of the bones.

Left foot and ankle in place and of good shape.

Patient suffers with continued pain in left side of the head; sight in left eye much impaired, and eyeballs very prominent, as if the orbits had been thickened and the soft parts pushed forward. At times the pain in the head is said to be quite intense.

Complexion sallow, with leaden, jaundiced hue, and anæmic; the complexion of this patient resembles in all respects that of one who has been long subjected to the action of the malarial poison, and whose blood, liver, and spleen have been thoroughly affected by its action.

The effect of the mollities ossium has been to arrest the growth of the patient, for although eighteen years of age, she is only three feet nine inches in length, and weighs not more than a child of four years of age. In exhibiting the case before the medical class, I took Miss Drucilla out of the carriage and carried her up stairs into the amphitheatre in my arms, with as much ease as if she had been a small child.

Intellect clear, and spirits good and cheerful; talks most intelligently and cheerfully, and although confined entirely to the bed,

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and unable to do anything for herself, is a great comfort to her mother, and a general favorite with all; and her mother told me that in their great poverty and distress, and in the numerous straits which befell them, she was her main stay for advice.

The softening of the bones does not appear to have had any connection with syphilis, as the patient was perfectly healthy up to the time of the appearance of the malarial fever, at the age of five, and her younger sister, born after the family left the unhealthy island on the Ohio River, is a fine healthy girl of ten years of age, with full well-formed limbs, and rosy, healthy countenance.

The ill-health of the father appears to be due to bad diet and the irregular habits and exposure incident to great poverty.

The menstrual function has never been performed by this patient.

I conceived the indications in this case to be:—

1st. The enrichment of the blood with those salts which were wanting, and which would more especially supply the elements for the bones.

2d. The improvement of the general condition by nutritious diet and the action of alteratives.

3d. The regulation of the bowels, which had been habitually constipated or costive.

4th. The restoration, or rather the establishment of the function of menstruation.

We sought to accomplish these results by the administration of fifteen grains of a mixture of equal parts of the phosphates of iron and lime in a cup of rich, fresh milk, three times a day; by an alterative plan of treatment, consisting of iodide of iron and iodide of potassium (℞. Syrup of the iodide of iron, f℥j; Iodide of potassium, ℥ij; Syrup of ginger, f℥viij.—Mix. Teaspoonful in wineglassful of water three times a day); and by the regulation of the bowels and uterus by the pills of aloes, rhubarb, and myrrh of the United States Pharmacopœia, and the administration in liberal quantities of digestible and nutritious diet.

Under this treatment, the menstrual function was established (in the language of her mother, "she became a woman"), the general health improved, and the head-symptoms were alleviated.

In the latter part of December, my residence was destroyed by fire, and having to transfer my family to Georgia, and amid a pressure of cares and labors I lost sight of this case; previous to this, the mother was in the habit of calling at my office every day

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for advice and assistance, and my visits also were at regular intervals.

I was subsequently informed by her mother, that Miss Drucilla died after a brief illness, on the 1st of February, 1869. I could gather nothing more than that the illness was brief, and that both the stomach and head were deranged about the time that the menses should have appeared.

The connection of this case in its origin, with a severe and prolonged attack of malarial fever, during exposure for months to a damp unhealthy malarious atmosphere, is interesting and important.

I have elsewhere shown that the malarial poison not only destroys the blood corpuscles more rapidly than any other febrile poison, but also *diminishes the phosphates of the blood.* (*Observations on some of the Physical, Physiological, and Pathological Phenomena of Malarial Fever, Transactions of the American Medical Association,* 1859.)

Rapid destruction of the bones, as well as of the integuments and muscles, has been sometimes witnessed as one of the results of the action of malaria upon the human system, and I have elsewhere recorded such cases (*Transactions American Medical Association,* 1859); and at the present time (March, 1869), I have in my wards in the Charity Hospital a case of chronic malarial poisoning, in which one leg has been destroyed by extensive ulceration, and the other leg is threatened by large ulcers. A careful examination of the histories of these cases demonstrated that the destruction of the tissues could be referred neither to the action of mercury nor to the effects of acquired or hereditary syphilis.

It is possible that in certain stages of malarial fever, and in certain states of the human system, acids, as the phosphoric and lactic, capable of acting upon the inorganic constituents (or mineral elements of the bones, phosphate and carbonate of lime, and phosphate of magnesia), may accumulate in the blood and structures, and cause a solution and absorption of the earthy matters. By numerous analyses of the urine in malarial fever, I have shown that during the chill, and at the very commencement of the hot stage, phosphoric acid disappears almost entirely from the urine, whilst the organic acids and sulphuric acid are increased; as the hot stage progresses, and the febrile action and the heat commence to decline, there is an augmentation of the phosphoric acid; the uric acid is either increased or remains at the normal standard during the chill, disappears almost entirely during the fever, and

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then increases rapidly and rises to a high figure after the subsidence of the febrile excitement, and often continues for days two, three, and even six times more abundant than in the normal state. The salts of lime contained in the urine also undergo marked variations in quantity during the different stages of malarial fever, diminishing during the chill and first stages of the fever, and increasing as the febrile excitement declines. In the first stages of the paroxysm the phosphoric acid appears to be, to a considerable extent, free, and uncombined either with the alkalies, soda and potassa, or lime; after the continuance of those changes which result in the increased formation of phosphoric acid in the nervous and muscular structures, the insoluble phosphates of the structures appear to be dissolved, and hence the accumulation of the salts of lime in the urine. On the other hand, the chloride of sodium, a highly soluble salt, increases in the earlier stages, and diminishes in the urine during the intermission or remission.

The pale, sallow, anæmic hue of this patient, together with the rapid, feeble pulse, and periodic febrile excitement, indicated profound alterations in the composition of the blood, and derangement of the nutrition of the organs and tissues.

It is not unreasonable to refer the origin of the disease in this case to the derangement of the blood and nutritive act by the presence and continued action of a specific poison, especially as this disease is known to originate most frequently amongst the ill-conditioned and ill-fed inhabitants of large manufacturing towns, and in females whose menstrual function had been deranged for long periods of time, or whose forces had been depressed by the demands made upon the nutritive elements by repeated pregnancies.

In a word, we are disposed to refer the origin of the disease in this case to constitutional derangements, rather than to a strictly local disease of the bones.

This conclusion is further sustained by the fact that a large proportion, if not all the cases of mollities ossium heretofore reported, exhibited marks of constitutional derangement, fever, wasting, and abnormal condition of the urinary secretion preceding and accompanying the local disease in the bones.

We cannot regard the osseous tissue solely from a chemical point of view; neither is it correct to regard it as a simple, uncomplicated texture. In addition to the phosphates and carbonates of lime and magnesia, which might be regarded as comparatively devoid of vitality, bone presents a complicated structure into which

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the most highly vitalized and most complex tissues, as vessels and nerves, enter. The numerous cavities and canals which penetrate the fresh bones are not empty, but contain a true nutritive plasma, complex in its constitution, derived primarily from the blood circulating through the osseous tissue, and obtaining its physical and chemical elements directly from that fluid, and, in common with all the other fluids of the body, subject to physical laws of endosmosis and absorption, and to chemical changes. The investigations of Virchow, Donders, and Hope have even rendered it probable that the bone-corpuscles and their prolongations are lined by a membrane, and cannot, therefore, be viewed as simple excavations in the compact structures.

It is not unreasonable, therefore, to refer certain structural alterations of the bones to derangements of the blood, from which the nutritive fluids and plasma of the cellular spaces are derived. While an excess of earthy salts in the blood, conjoined with an increased alkalinity, may tend to the deposition of phosphates, on the other hand an increase of acid in the blood, whether received from the alimentary canal by absorption, or from the mal-assimilation of the elements of the nutritive fluids, or from some arrest or perversion in the process of secretion, would tend to the solution of the mineral constituents of the osseous system.

In the following case, reported by Sylvanus Bevan, the softening of the bones was preceded and accompanied with a frequent and copious discharge of urine, gradual wasting of the body, hectic fever, quick, feeble pulse, thirst, pains in the shoulders and limbs, and loss of appetite. After the continuance of these symptoms during the period of two years, accompanied with great emaciation, the patient was attacked with an intermittent, which appeared to alter the character and quantity of the urinary discharge, and, after the relief of the intermittent fever, the appetite returned, the breathing became freer, and the hectic fever was much lessened; but the pains in the limbs continued, and, after being confined to her bed for several months on account of the weakness and pains in her limbs, the bones of the legs became soft and pliable.

CASE II.[1]—The wife of one B. S., in the year 1738, was taken with a diabetes, with the usual symptoms, viz., a frequent and

[1] An Extraordinary Case of the Bones of a Woman becoming Soft and Flexible. By Mr. Sylvanus Bevan, F. R. S. Philos. Trans., vol. xlii., 1743, No. 470, p. 488.

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copious discharge of urine, a gradual wasting of the body, a hectic fever, with a quick, low pulse, thirst, great pains in her shoulders, back, and limbs, and loss of appetite. She continued thus two years, much emaciated, though using the common medicines; at which time she was attacked with an intermittent, which soon left her; after which the diabetes gradually decreased, so that in a few months she was free from that disease, but the pains in her limbs still continued. She recovered her appetite, breathed freely, and her hectic much lessened, though she had some appearance of it at times.

About eighteen months since, she had such a weakness and pains in her limbs, that it confined her to bed altogether; and in a few months the bones in her legs and arms felt somewhat soft to the touch, and were so pliable that they were bent into a curve; but for several months before her death they were as limber as a rag, and would bend any way with less difficulty than the muscular parts of a healthy person's leg without the interposition of the bones.

April 12, 1742, after a tedious illness, she died, near the age of forty, and, with the consent of her friends, a post-mortem examination was made. On raising the cutis, the membrana adiposa was found much thicker than was to be expected in a person so much emaciated; the sternum and ribs, with their cartilages, were very soft; and all the cartilaginous parts of the ribs, at their articulations, from the clavicle downwards, were doubled over each other, on the left side, about an inch. On raising the sternum, he found the lungs adhered close to the ribs for four or five inches on each side, but were more loose and flaccid than usual, and much less in size; her heart was of the common size. Upon viewing the liver, it was found to be at least a third part larger than common; the spleen was about half an inch in the longest part, and a quarter of an inch thick; the intestines were very much inflated. She had appearances of several anchyloses formed in the small joints, viz., carpal and metacarpal bones; but, on laying them open, Dr. Bevan found them only like a thin shell. The cartilaginous epiphyses of the bones were entirely dissolved, and no parts of the heads of the bones remaining but an outside not thicker than an egg-shell.

On making incisions in her legs and arms, five or six inches long, Dr. Bevan found the outer laminæ of the bones soft, and become membranous, about the thickness of the peritoneum, containing, instead of a bony substance, a fluid of the consistence of honey, when it is thick, of a reddish color, not at all disagreeable

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to the smell. There was no appearance of any bones in her leg and arms, except near the joints, which were in part dissolved, and what remained were very soft and full of holes, like a honeycomb; also the bones of the head would easily give way to the pressure of the fingers. It is remarkable that those parts of the bones that are most compact and hard were first dissolved, while their heads, which are more spongy and soft, had not so entirely lost their substance.

When she was in health she was five feet high, but after her death she was but three feet seven inches in length, though all her limbs were stretched out straight, which is seventeen inches shorter than she was in health.

In the following case of Anne Elizabeth Queriot, of Paris, reported by Ambrose Hosty, the disease occurred after pregnancy, and was attended with great pain and weakness in the limbs, with an abundant white chalky sediment in the urine, which fermented strongly with acids; dead, œdematous state of the flesh; rough, scaly skin; increased heat, cough, laborious respiration and spitting of blood, and black sputa which stained the napkins, and also with a peculiar sweat, which stained all the linen that touched her skin. The attendant physician supposed that the phosphate of lime was discharged both by the skin and kidneys, and in the sputa.

CASE III.[1]—Anne Elizabeth Queriot, aged 35, native of Paris, was married in the year 1746, was brought to bed in 1747, and for the first time complained of great weakness in the small of her back, loins, and thighs, and could scarcely walk. A second lying-in, a year after, removed her complaint for about six weeks; after which it returned. In the year 1749, being two months and a half with child, she was seized with a loss of blood, and miscarried. Two months after, she fell on her left side, which gave her great pain in her leg, thigh, and hip of that side, and made them swell; but there was neither fracture nor dislocation. Her pains, after some time, abated; but the weakness of her limbs continued.

She was a third time with child, which revived her former pains, and caused her pains all over her body, with a swelling as before. This confined her to her bed, yet her pregnancy terminated favor-

[1] The Case of Anne Elizabeth Queriot, of Paris, whose Bones distorted and softened. By Ambrose Hosty, M. D., of Paris. Philosophical Transactions, 1753, vol. xlviii. p. 26; Abridgment of Phil. Trans., vol. x. pp. 313–316.

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ably, after which the swelling went off; but her limbs were so weak that she could not stand upon her feet.

In about six months after her last lying-in her pains returned worse than before; and about the same time an abundance of white chalky sediment appeared in her urine, and the forefinger of her right hand was observed to be distorted towards the little finger, which was the first appearance of the dissolution that ensued. Soon after, the lower extremities began to turn upwards gradually, and almost in a parallel line with her body, and continuing till, in nine months, her lower limbs were turned upwards. All the bones were affected, especially the thorax, which had lost its natural form and capacity, and she was altogether miserably distorted.

This miserable state was attended with exquisite pains, and according to the seat of them the patient used to say, "Now, such a part works." Sometimes they abated, and then she felt so sore as not to bear being touched; and during this ease from her pains, a quantity of the aforesaid sediment passed by urine, though little or none passed during her sufferings. It was quite cretaceous, and, reduced into a fine powder, fermented gently with acids. She could bear no covering but a few napkins, both from inward heat, and to avoid loading her breast. Notwithstanding her preternatural posture, the evacuations by stool and urine were regularly and easily performed. Her flesh seemed dead and œdematous, the skin rough and scaly, so that a mortification was often apprehended. She had a cough, a laborious respiration, and sometimes a spitting of blood, from the coarctation of her breast, all its bones plying inwardly. She was capable of no other motion than turning her head on both sides, stirring her left arm in the shoulder-joint only, and separating her fingers, but not bending them. She had her menses regularly till about three months before her death. She generally had a low fever, inward heat, sweats, and restlessness. Her fever ran very high in August, attended with delirious headache, raving, and subsultus tendinum. A little before her death, came on a deafness, a dimness of sight, a scalding of her eyes, and a constant dropping; violent pains in her head—in short, a great weakness in all the organs, which showed how much the head was then affected.

The distortion of her limbs went on so fast in August and September that almost every day something new was observed; especially the left foot, during that time, came down gradually near

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eighteen inches from under her ear, where it lay before. It was also observed, in August, that her neck grew visibly smaller, the thorax much narrower. And then the napkins in which she spit grew black in the washing, and stained as from the mercurial ointment; though this cause was not suspected, as it could not be learned that she had ever used any mercury. In a month after he observed the same thing on all the linen that touched her skin. He got a napkin rubbed with soap, then dried, and afterwards washed. This method had almost taken off the stains, as it does those from the mercurial ointment. Her linen stained all the washing, like linen impregnated with it. These spots appeared on the linen a mixture of a cretaceous matter and grease. Since this remark was made, more of the white sediment was seen. This and the apparent nature of the stains, made him believe that it was then discharged by the spittle and the pores of the skin, and mixed with oily particles of her fluids, which had acquired a quality analogous to that of mercury, of staining all linen. Dr. Hosty was also led to think that this sediment was the earthy matter that gives the bones their solidity and hardness, which had been dissolved by the same vitiated quality of the fluids, and evacuated by the emunctories already mentioned.

After great sufferings she died the 9th of November. Her body was opened in the presence of some of the most celebrated anatomists and academicians of Paris. The operation was begun on the left tibia, cutting on the fore-part of it from below the knee to its basis. It was wonderfully altered; more or less soft in all its length; in some points entirely dissolved, and its sides not thicker than the gristle of the ear. The spongy substance of its extremities supple, yielding to the least pressure. The reticular matter was quite destroyed. The peroné was entirely dissolved in the middle, and only slight marks of its extremities remained. Instead of marrow, they found in all the bones a red, thick matter, like coagulated blood, mixed with grease. The rotula was entire, but very soft and spongy; the condyles of the femur the same. All the cartilages were found in their natural state. The head of the humerus was much diminished and flattened, its middle part very small, pliable, softened in all points, yet in some friable.

The cubit and radius suffered the same alterations with the humerus. By stretching all her limbs they laid them straight; but they soon after returned to their former curve. The phalanges of the fingers were not so much softened, but were easily cut and

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bent like whalebone. The femur was rather a fleshy body than a bone; its cavity was filled with a reddish suet, instead of marrow, which accumulated in different points, and bulged out the fleshy sides. The capacity of the pelvis was much diminished; the bones that composed it were softened, thickened, and contracted. The spine kept its natural form; the vertebræ soft and supple. The sternum and all the cellular bones seemed solid, but could bend, and were easily cut. The ribs, though softened, were still friable. Some of them, towards the sternum, were doubled over each other. The clavicles seemed almost cartilaginous. The shoulder-blades were much thicker than natural, less broad, and entirely disfigured. The two protuberances called acromion and coracoides, almost joined. The skull bones were easily cut in slices, and were twice as thick as in their natural state. Both plates were joined in one, and no traces at all of a diploe. Their substance abounded with an extremely diluted serum, easily squeezed out by a gentle pressure of the fingers. The sutures almost obliterated; the bones of the basis and face shared in the calamity. The teeth hard as usual. The dura mater was incorporated with the bones. The brain not softer than ordinary; its right hemisphere was by one-third larger than the left, and hence, perhaps, the weakness of her left side, often manifested by pains, aches, defluxions, heaviness, falls on that side, and every illness which she had from her infancy, beginning in some part of it. When young, she fell on her head down two pairs of stairs. The membranes that separate the two hemispheres of the brain were much thicker than common. In fine, all her bones were so soft that the scalpel, with very little force, ran through the hardest of them, even the rocky apophysis of the ear bone, so called from its excessive hardness.

Nothing extraordinary was found in the viscera; but their size diminished by the compression, and a universal cachexy.

There could be no cause assigned of this woman's disorder, as she gave no signs plain enough to prove either a scurvy, pox, or king's-evil, either hereditary or acquired; her parents having lived healthy, the one to the age of eighty, and her mother being then alive aged sixty, and in good health. She had three children, who died of disorders common to their age; one, four years old, died of the measles.

In the following case of Mary Hays, reported by John Pringle,

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the patient suffered first with chlorosis (green sickness) and suppression of the menses, and was then seized with pain universally, attended with feverish symptoms.

CASE IV.—Mary Hays,[1] of Stoke-Holy-Cross, near Norwich, gave the following account, June 21, 1752: That she was born Jan. 11, 1718, and never married, nor was addicted to any kind of intemperance; that her father was unhealthy a great part of his life, but she knew not what disease he was subject to; that her mother died when she was a child, but she did not remember having ever heard of her being unhealthy; that she herself was always considered as a healthy, strong girl, till about fifteen years of age; then fell into the green sickness, and took various medicines to no purpose; that this disease, as far as she could recollect, was all she had to complain of, doing the ordinary work in a farmer's house till October, 1748. She then was seized with pain universally, attended with feverish symptoms. Thus she continued seven weeks, after which the pain was chiefly confined to her thighs and legs, but not increased by external pressure.

In September 1749, she broke her leg as she was walking from the bed to her chair, without falling down, and heard the bones snap. The fracture was properly treated, and regard had to her disposition; but the callus was generated, the bones growing flexible from the knee to the ankle in a few months, as did those of her other leg. Soon after those of her thighs were visibly affected in like manner. Both legs and thighs then became œdematous, and subject to excoriate, discharging a thin yellow ichor. The winter after breaking her leg she had symptoms of the scurvy, and bled much at the gums.

Many eminent physicians, who were of opinion that this disease of the bones might arise from acidity abounding in the blood, prescribed for her, but without effect, unless the regularity of her menstruation for the last eighteen months may be attributed to a chalybeate medicine, though medicines of that nature had no effect formerly, when she was in a condition to take exercise and regularly persisted in the use of them.

For some considerable time past she had found little alteration in her complaints in general, though her appetite and digestion were rather better, but that the difficulty of breathing, which she had

[1] A Remarkable Case of Fragility, Flexibility, and Dissolution of the Bones. By John Pringle, M. D., F. R. S. Philos. Trans., 1753, vol. xlviii. p. 297; Abridgment of Philos. Trans., vol. x. pp. 406–408.

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long labored under, gradually increased, and the thorax appeared so much straitened as necessarily impeded the expansion of the lungs.

Her spine became much distorted, any motion of the vertebræ of her loins gave extreme pain, and her thighs and legs were become entirely useless, which wholly confined her to bed in a sitting posture; and the bones she rested on, having lost their solidity, were much spread. Also the ends of her fingers and thumbs, by frequent endeavors to lift herself up for ease, became very broad and flat. Then she measured but 4 feet, though before this disease came on her she was about 5½ feet high, and well shaped.

This is the best information that could be obtained from her own mouth, and what was observed in the case before and at the first mentioned time, when she readily consented to the examination of her body, etc., after death.

From that time to her death, which happened July 6th, 1753, the chief thing she complained of, and what the people about her observed, was a gradual increase of difficulty of breathing, a wasting of flesh, a cessation of her menstruation for the last four months, a tendency in her legs to mortify, which had *long been anasarcous*, and excoriated almost all over; she retaining her senses perfectly to the last moment of her life, and dying without showing the least signs of the agonies of death.

Two days after death, her limbs being first well stretched out, she was exactly measured, and found wanting of her natural stature more than 2 feet and 2 inches. Then the thorax and abdomen were opened, the sternum being entirely removed, with part of the ribs, in order to gain at once a full view of these cavities, and discover how the viscera there contained had obstructed each other in their respective functions. The heart and lungs were sound but flaccid, and much confined in their motion, to which the enormous size of the liver contributed in some measure, extending quite across the abdomen, and bearing hard against the diaphragm. The lungs did not adhere to the pleura, nor was the liver scirrhous, but faulty only in bulk. The mesentery was sound, except only one large scirrhous gland on it. The pleura extremely small. Nothing else was found observable in these cavities.

The skull was not opened to examine the brain, as intended, through want of time, the minister waiting at the church for interment, and the relatives becoming impatient; but the operators had no reason to suspect any defect there, from any previous complaint.

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All her bones were more or less affected, and scarcely any would resist the knife. Those of the head, thorax, spine, and pelvis nearly to the same degree of softness. Those of the lower extremities much more dissolved than those of the upper, or of any other part. They were cut quite through their whole length without turning the edge of the knife, and much less resistance was found than firm muscular flesh would have made, being changed into a kind of parenchymatous substance, like the soft dark-colored liver, only meeting here and there with bony laminæ, thin as an egg-shell.

Those bones were most dissolved which in their natural state were most compact and contained most marrow in their cavities, and the heads of them were last dissolved.

This perhaps is the more worthy of observation, as it held good throughout, and looks as if the wonderful change they had undergone might be caused by the marrow having acquired a dissolving quality, for it was evident that the dissolution began within side, from the bony laminæ remaining here and there on the outside, and nowhere else, and the pain not being increased at first by external pressure.

The periosteum was thicker than ordinary—the cartilages rather thinner—but nowhere in a state of dissolution like the bones. The day after this examination some of the whole substance of the leg and thigh bones, that was entirely dissolved into a kind of pulp, was sent to an ingenious chemist, and by the experiments which he made he said he could discover neither acid nor alkali prevailing in it.

The disease in the following case, reported by Dr. J. W. Tenney, was preceded and accompanied by general weakness, emaciation, and copious discharges of urine, depositing an abundant light-colored sediment, and by suppression of the menses. The patient referred the origin of the disorder to exposure to a cold atmosphere and standing in snow in thin shoes after fatigue and profuse perspiration.

Case V.—Mrs. D. W., æt. 43, was the mother of five children. Her health had been but indifferent for the last fifteen months. She complained of general weakness, and especially in her lower limbs, emaciation, very copious discharges of urine depositing an abundant light-colored sediment. She had experienced some colic pains, and in walking her gait was rolling, bringing the centre of

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gravity at each step directly over the limb on which the weight of the body was thrown.

Her menstrual periods had ceased for about eighteen months. The origin of her disorder she had always supposed to have been exposure to a cold atmosphere and standing in snow in thin shoes after fatigue and profuse perspiration. After that period hitting the foot, in walking, against the slightest impediment was sufficient to throw her down.

In November last, being troubled with neuralgic pains about the face and jaw, and supposing they might proceed from a decayed tooth in the under jaw, she requested that it might be extracted, but on attempting to raise the tooth with the forceps it was found necessary to desist and use rollers, as the bone seemed to bend though but slight force was used. A few days after it was found so difficult to extract the last tooth on the right side from the want of firmness in the bone and tension in the muscles that it was left in the socket. From this time the muscular strength of the patient failed fast, though her appetite remained tolerably good, and her stomach generally retained and digested her food, though it occasionally rejected all nourishment for a day or two. She became at length unable to support her weight or raise herself from the bed to which she was soon confined.

In the latter part of March her thigh-bone was found flexed at about a right angle near the centre. The patient was not sensible of it till it was accidentally discovered and supposed to be broken; but, upon bringing it into its natural position, no crepitation was perceived, and the extreme emaciation of the limb enabled us to satisfy ourselves that instead of being broken the limb was bent.

The outer limbs on examination, also, were found in the same condition, especially the long bones, which had so far lost their firmness as to be perfectly flexed from their position, which they would receive again by their elasticity.

The disease still continued its progress, the firmness of the bones diminishing till June 9th, when she expired. During this time the mental faculties remained bright, and with an unusually rapid flow of ideas; voice strong, pain not severe.

Autopsy 26 *hours after death.*—Corpse perfectly flexible; emaciation extreme; œdema of the lower limbs, and right arm, which had supervened during the last two or three days; fulness and hardness of the abdomen; thighs evidently shortened.

On cutting down upon the left femur, where the alteration of

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structure had first showed itself, no fracture was found, but the bone had doubled over on itself in such a manner that without altering the general direction of the limb it had shortened it about two inches.

About two inches below the lesser trochanter, the bone formed a right angle by bending inward, producing a prominence which might have been mistaken for the greater trochanter, while the limb was covered by the integuments. The neck of the bone was also bent, approximating the head of the bone to the greater trochanter. The bone was so soft in every part as to be easily pierced by a scalpel. The cartilage covering the articulating surface was in its natural state, but much harder than the bone. On laying open the medullary cavity, the medulla was found disorganized, very much resembling coagulated blood. This cavity was much larger than common, and the osseous substance much diminished. It was so thin and devoid of earthy matter as to be easily compressed by the fingers, so as almost to obliterate the internal cavity.

The external surface of the bone was less diseased, the osseous matter remaining being principally upon the outside. This bone was entirely detached and preserved.

The bones in the other parts of the body were examined, and found more or less in the same condition. The right humerus and femur seemed equally flexible, and had not retained their shape; the bones of the legs and forearms, though retaining their shape, could evidently be bent considerably and recover their position, though, if the strain was carried beyond a certain point, the texture was broken, and it would not recover its position, though a perfect fracture would not take place.

The phalanges of the fingers, the tarsal bones, the bones of the pelvis, the cranium, could all be pierced by a scalpel. The bones of the spine were so soft that the vertebræ could be cut into or their processes cut off with more facility than if they had been cartilage. The ribs of the right side had doubled over upon themselves, in a manner similar to the femur, so as to shorten them about an inch and a half, and materially diminish the capacity of that side of the thorax.

The muscular texture of the body was materially altered. It was pale, flabby, and so destitute of fibrin that it could be easily torn; even the tendinous portions of the muscles possessed little more strength than the loose cellular tissues of the body.

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This appearance, in a greater or less degree, existed through the whole muscular tissue. The heart, for instance, was flabby, and could be easily cut with the finger-nails, especially the right side. The uterus was in the same state, though not to the same degree.

The nerves retained their natural form, hardness, and strength. The brain was not examined, as no symptoms during life indicated any disease of that organ. The lungs were healthy, though the common observation that they were softer than natural might be applied to all the internal organs. The omentum had a dirty appearance, and rough, gritty feel. Coats of the stomach healthy. Kidneys healthy.[1]

It is worthy of note that in the preceding case the *muscles* were altered as well as the bones; and in this softening and perhaps *fatty degeneration* of the muscles we find additional and conclusive proof that the origin of the disease cannot be referred alone to the local changes in the bones.

If the disease was dependent upon an inflammation and alteration of the periosteum, we would not find this membrane so uniformly healthy and unaltered.

That the blood and bloodvessels are active in the changes of the bones, without any true inflammatory action, appears to be clearly shown by the fact that the wasting proceeds from within outwards, from the most vascular to the less vascular.

The following case of mollities ossium, reported by Thomas K. Chambers, M.D., is interesting, as affording a portrait at an early stage of the disease, when it has rarely been a subject for observation, and as indicating that the degeneration of the bones was preceded by that of the muscles, and that the degeneration of the two tissues was dependent upon the same crasis.

It is also worthy of note that the degeneration was least advanced in the external circumference of the bone, and perfect fat-vesicles were found in both bone and muscle.

CASE VI.[2]—The case was that of a young woman, twenty-six years of age, admitted into St. Mary's Hospital in March, 1853. She had never been able to follow any calling, on account of weak health. The principal features of the case, in the early stage, consisted in defective muscular power, the flesh of the body feeling

[1] Case of Mollities Ossium. By J. W. Tenney, M.D., of Webster, Mass. American Journal of the Medical Sciences, vol. xxvi., 1839, pp. 506–509.

[2] Lancet, March 25, 1854. Ranking's Abstract, 1854, vol. i. p. 114.

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exceedingly soft and flabby, the calf hanging down flaccid and baggy. During her residence at St. Mary's Hospital the bones of the back and limbs were examined several times, without any deviation from the natural state being discovered.

Spontaneous fracture, first of one femur and afterwards of the other, occurred at St. George's Hospital, and subsequently very marked changes in the osseous structures took place. Thus, in April, 1853, the right arm became painful to the touch, and paralytic; in May the same misfortune happened to the left upper extremity; in June the pelvic arch gave way; in July the ribs on the right side fell in, and she began to suffer much from dyspnœa and cough; in August the bones of both arms were quite soft; towards the end of October the distortion of the lower parts of the trunk was so great that the feces could not be expelled. She died in November.

The bones throughout the whole system were found soft and unresisting, and a sharp instrument could be readily passed through them. A section of the tibia was of the color of muscle, and presented to the knife scarcely more resistance than brain, its shape being retained by the aid of the tough periosteum.

The microscope exhibited the bone as consisting of large fat vesicles, some containing a white, others a reddish oil. The parts next the periosteum, which felt gritty, presented, when examined under a quarter-inch glass, some islands of opaque bone, the bone-corpuscles being indistinct, and the canaliculi not to be discovered.

The addition of hydrochloric acid caused a slight disengagement of gas.

The muscular fibre presented everywhere the characteristic degeneration.

In the preceding case the muscular system, as well as the osseous, had undergone fatty degeneration.

Mr. Samuel Solly has described two interesting cases of mollities ossium, which agree in their general symptoms with those previously recorded.[1]

Case VII.—The first case described by Mr. Solly was that of a young woman, aged twenty-nine, who, having enjoyed good health in early life, began to decline at nineteen, after an attack of scarlet

[1] Medico-Chirurgical Transactions, vol. xxvii.; 2d series, vol. ix., 1844, pp. 441–455. Medico-Chirurgical Review, April, 1845, Am. ed., pp. 448–450.

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fever. She suffered pains in the back, and passed urine with a whitish sediment, and her spine began to yield. The clavicle, which was fractured from a slight cause, had united again. The spine began to yield about the age of twenty-four or twenty-five; the patient began to stoop, and could not support herself in the upright position for any length of time. At this time she had paralysis of the right hand, which took place suddenly, and lasted about fourteen days.

A visit to Gravesend was proposed by her friends, but in crossing King William Street she fell down and struck her knee against the curbstone. For this accident she was admitted as an out patient at the Western Dispensary, and continued so about six months. She derived benefit from bathing the knee with salt water, and the limb was restored sufficiently to enable her to walk. After this she kept a day-school, but became nervous and desponding. Her friends remarked great difference in her manner, her disposition seemed changed from an open and amiable temper to one of restlessness and suspicion. They became fearful that she was going out of her mind. She still, however, continued to conduct her school with her usual attention and care.

In May, 1839, being exposed to damp, she had an attack of acute rheumatism, when she was placed under the care of Mr. Dutton, of York Street, Bryanstone Square.

She was confined to her bed for six weeks, but during the course of her disease she complained very much of pain over the head, but particularly at the posterior part. She was occasionally violently delirious. At the approach of convalescence, mania set in, and during its existence she attempted to commit suicide.

In August, 1839, she was removed to St. Luke's Hospital. At this period her general health was better than it had been for some time, and her appetite was good, but the catamenia had ceased for about three months. She was much deformed about the hips and shoulders, but not in her extremities.

Her mother reports that she was able to walk for about six months after her admission into the hospital. Though suffering a good deal of pain, her mind was improving, and hopes were entertained of her speedy and total recovery, when she slipped down and suffered much at the time, but there was no fracture, and the injury was considered of so slight a nature that the surgeon of the institution was not consulted about it. But from this time the mother states she was not able to stand alone; she was carried, or

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pushed herself from place to place on her haunches, and, though she frequently screamed violently as if in pain, she had no fit, nor did she lose her senses. She was not unruly, nor at all maniacal, but worked with her needle in her usual quiet manner. The progress of the disease affecting the condition of the lower extremities was evidently the sole cause of her inability to walk. The head was now first observed by her mother to be enlarged, and the eyes to project, caused no doubt by the thickening of the walls of the orbits. After remaining at St. Luke's thirteen months she was discharged incurable, but not paralytic; on this point, I took care to assure myself particularly. From this hospital she went to the Marylebone Infirmary, where she remained five weeks, from thence she was removed to the Islington Infirmary, where she remained two months, but Dr. Solly was not able to gain any particulars of importance regarding her condition in those institutions. She was then sent to the Lunatic Asylum at Hoxton for six weeks, was again received into the Islington Infirmary, from whence she was sent to Hanwell on the 11th of April, 1842.

At the time she was received into this asylum, she was much emaciated and enfeebled, with loss of power in her lower extremities, and two or three months before her death the bones of the extremities were observed to lose their natural direction and become curved. Subsequently fractures took place from the slightest causes. She suffered excruciating pain during the whole time she was in the asylum, which she referred to her bones; she did not suffer from spasm of the muscles, as many of these cases do, and the urine, during the whole time she was at Hanwell, was clear and natural. Her appetite was good, and all the functions duly performed, with the exception of the catamenia. Large doses of morphia and other sedatives were administered, to procure sleep and relieve pain. Her mental aberration was extremely slight. Her sufferings were terminated by death, on the 28th of October, 1842.

Post-mortem examination of the body, Hanwell, October 29th.—Height, measured after death, four feet two inches, great emaciation. Head large in proportion to the size of the body; chest very much deformed, pinched up, and projecting anteriorly, very narrow from side to side; the ribs appeared widened, the pelvis extremely narrow, spine curved forward almost at a right angle in the upper dorsal and cervical regions. Both clavicles broken and bent at an acute angle; head of one humerus swollen, shaft of the left broken

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and bent; radius and ulna slightly swollen, the right radius broken; the lower extremities enlarged at the epiphyses; ossa femora on both sides broken, that on the right side in one place, that on the left in two; the fractured portions were held together by the periosteum, but there was no attempt at union, nor appearance of callus; tibia and fibula on both limbs bent; all the bones of the extremities could be fractured with the slightest force; by merely pressing them between the finger and thumb they gave way and cracked like a thin-shelled walnut. A longitudinal and transverse section of the long bones showed that the osseous structure of the bone was nearly absorbed, a mere shell being left. The interior was filled with a dark grumous matter, varying in color from that of dark blood to a reddish-light liver color. I could not detect any pus globules in it under the microscope. The bones of the vertebral column and ribs were similarly affected; cranium very much thickened and at least half an inch in diameter, so very soft as to be easily cut with a knife, and very vascular; the two tables were confounded, and the diploë obliterated. Thin slices of the cranium, under the microscope, showed that a considerable alteration had taken place in its ultimate structure. The laminated structure of the outer and inner tables was extensively absorbed. The Haversian canals enormously dilated, and the osseous corpuscles diminished in quantity. Joints all healthy; cartilages perfectly natural. Weight of brain 2 lbs. 5½ ozs.; arachnoid membrane milky and slightly thickened. The brain as well as the viscera of the chest and abdomen were perfectly healthy.

Chemical analysis of the bone by Dr. Tuson:—

Medulla.

Animal matter	24.78
Phosphate and carbonate of lime	1.83
Water	73.39
	100.00

Bone.

Animal matter	18.75
Phosphate and carbonate of lime	29.17
Water	52.08
	100.00

In the preceding case the parents were healthy, both of whom were living at the time of the report; the mother aged 61, and the father 66. She lost one sister at the age of 21, of apoplexy,

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and a brother at the age of 33, of diseased liver, and some affection of the head. She enjoyed a good state of health up to the age of 16; was well developed and inclined to be corpulent; her mental faculties were remarkably acute, and at the early age of 16 she held the situation of governess in the family of a colonel in the army. It is worthy of note that the disease supervened after an attack of scarlet fever (soon after the age of 19), and that whilst in the earliest and most active stages, the urine contained a whitish sediment, in the latter stages, this excretion was clear.

In the second case reported by Mr. Solly, the urine was found on examination to contain a large quantity of phosphate of lime, between three and four times the quantity of healthy urine. The examination of the bones after death showed an excess of fatty matter, deficiency of the phosphates, and disproportion of the medullary cells to the substance of the bone. The left kidney contained a calculus, consisting solely of the phosphate of lime.

The following is the report of this case by Mr. Solly:—

Case VIII.—The patient was a female, Sarah Newbury. I found her sitting up in bed; her countenance very cheerful, and, excepting its extreme emaciation, not unhealthy. Her mind was very active, and all her answers to my questions clear and intelligent. She is thirty-nine years of age, and has been married nine years and a half to a strong, healthy man in the police force; has never had any children. Her height, at the time of her marriage, was about five feet five inches and a half; her general figure slight. She was born in Dorsetshire, but was in service for fourteen years in London, as a housemaid, previous to her marriage. She was always able to do her work with ease. Her general health has been good, though, she says, she never was particularly strong or robust, and has been subject to sick headaches. She has been always regular at her monthly periods, but has suffered both before and after marriage from the white discharge. She considers that her health has been failing her for about three years, but more than that time. In May, 1840—that is, about three years and a half ago—she was seized with a violent pain in her back when she was stooping; and after that she had a strange sensation down her right leg, as if a pea was rolling down. She does not remember any other circumstance relating to her general health, until June, 1841, when she had rheumatic pains in her limbs, but never any true rheumatic fever, nor any swelling of the joints.

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From this time she constantly suffered from what she considered rheumatic pains, and was so feeble on her feet that in February, 1842, she had a fall—which, in fact, she says she had been expecting every day—when her left thigh was much bruised; but she did not feel anything give way; but in consequence of the bruises she was confined to her room. After this, she occasionally suffered a great deal of pain in her limbs, which, she says, seemed to be in her bones; and she was not able to walk unless on her left leg, and with assistance, dragging the right after her. In the April following—that is, about two months after the accident—when her husband was lifting her from the fireplace to carry her to bed, she says she suddenly felt the most excruciating pain, just as if her thighs were being broken in a thousand pieces; and her husband told me that he felt her thighs give away, and that they were suddenly drawn up; and from this time she has been entirely confined to her bed. She says that the muscles of her arms were now painful and swollen, but by rubbing them with oils she relieved them.

Her present condition, October 2, 1843: I do not perceive anything abnormal in the appearance of the bones of the head or face. The countenance is emaciated. There is a lateral curvature of the spine; in the dorsal region the convexity is to the right, the concavity to the left. In the centre of the lumbar region the spine curves forwards; the inferior vertebræ, with the upper portion of the sacrum, projecting backwards; the lower portion, with the coccyx, turns suddenly forwards, forming almost an acute angle. On the left side the ribs project backwards to their anatomical angles; from that point they are bent directly forwards, forming an acute angle, which projects posteriorly, looking at first sight like the spinous processes of the vertebræ in a very thin person; the side of the thorax from the angles being flattened or slightly concave, and the lateral diameter of the chest much diminished in consequence. This latter deformity has evidently been produced by her lying altogether on the left side, either on a pillow or on her arm. The clavicles have both been fractured and reunited, and are bent at a right angle in the centre. The bones of the arm and hand are all natural. I could not examine very accurately the ilia, but I perceived that they were evidently folded inwards. Both thigh bones are broken. The lower portion of the left is twisted round, so that the patella faces inwards, as represented in the drawing. The right thigh is bent completely at an acute angle in the centre. The lower portion turned outwards.

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The tibia and fibula of both legs, and the rest of the bones, appear quite healthy.

I now made her an out-patient of St. Thomas's Hospital, for she refused to come into the house, and I prescribed for her a simple bitter infusion, as her appetite was failing. This, however, she refused to take; and I received a letter from her a few days afterwards forbidding my visiting her any more. I mention this to account for my losing sight of the case until the 12th of April, 1844, when her husband called on me to request that I would admit her into the hospital, which I did on the following Tuesday.

April 15, 1844. Present condition: The disease has been progressing, but not very rapidly.

The countenance is rather more emaciated, and both maxillæ appear narrowed from side to side. The alveolar cavities of the superior incisor teeth are softened, allowing them to protrude forwards, and she is not able to bite with them. The right humerus has given way in the centre, and the arm lies perfectly useless in the bed. It cannot be moved without giving her great pain. The radius and ulna are not apparently altered, but the metacarpal bones and phalanges are quite soft. The whole hand is rather swollen and puffy, and its natural appearance changed.

The thorax is much narrower. On the left side there is a depression about the circumference of an orange, the centre of which is occupied by the fifth rib—about an inch and a half from its junction with its cartilage; in this depression the action of the heart can be distinctly seen and felt. Its sounds are natural. I think that the spine is rather more curved than when I saw it in October. I do not perceive any particular alteration in the lower extremities, though it is most probable that the right thigh-bone has become more flexible, as previous to her removal to the hospital the foot was drawn completely over the head—the same position as represented in the case of Madame Supiot. She complains of the heat, and likes to have very little clothing, as much produces a sense of suffocation; she perspires very freely. I inquired of the sister whether she ever shows any particular desire for salt, as has occurred in similar cases, but I learn that she does not.

April 15. On her admission she was allowed wine and arrowroot, a mutton chop, and a pint of porter daily, and was also ordered the infusion of orange-peel, a rhubarb pill when necessary, and an opiate at night if required.

20*th*. On this day she died suddenly, without any circumstance

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having occurred during her stay in the hospital that I considered worthy of note, as illustrating the pathology of the case. I procured some of her urine, which was found on examination to contain a large quantity of phosphate of lime. Mr. Heisch, who examined it, says, "between three and four times the quantity of healthy urine."

She was too suspicious and irritable to let me venture to take any blood, even in the smallest quantity, during her life. As, however, it was perfectly liquid after death, I had no trouble in procuring some for examination under the microscope, but it did not exhibit anything unnatural. Dr. Rees kindly analyzed a portion of it, but he informs me he detected nothing abnormal. The immediate cause of her death appears to have been asphyxia. Mr. B. Travers saw her in her last moments, and he says the laboring condition of the respiratory organs was very painful to witness. She took a little wine about twenty minutes past six, when her sister noticed some difficulty of breathing, and the patient stated she thought she was sinking; she then became purple, and struggled some little time before she expired.

21*st*. *Post-mortem examination fifteen hours after death.*—Thermometer 60° Fahr. 10 A. M. General appearance of the body: great emaciation; integuments of the head and face and upper part of the neck, livid. As regards the state of the limbs, in addition to what has been reported during life, it was found that the radius and ulna on the right side had given way about the middle, and that the metacarpal bones and phalanges of the same hand were all flexible. On the left side all the bones of the upper extremity appeared in their natural condition, inasmuch as their form was not altered; but in testing their strength they yielded to a very slight force, and they might be bent in almost any direction, the laminated shell breaking off short. In the lower extremities the tibia and fibula of the left side yielded about two inches from the knee-joint; below this point they were firm. Those on the right side resisted pressure, and though they were not so heavy or hard as in a healthy subject, the disease had evidently made very little if any progress in them.

Head.—Calvarium very soft; dura mater excessively adherent, and, when torn off, innumerable vessels poured forth their blood in large quantity. The under surface of the calvarium was more vascular than I scarcely ever remember to have seen it, and all the vessels were full of dark blood.

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Some serous effusion within the cavity of the arachnoid.

The brain was healthy throughout; the hemispherical ganglion was natural in appearance, neither pale nor dark-colored.

Thorax.—This cavity was so much diminished in its transverse lateral diameter that a skewer passed from one side to the other, through the intercostal space between the fifth and sixth ribs, gave only four inches. On the right side there was a general depression of all the ribs; but on the left, the fourth, fifth, and sixth ribs were especially bent inwards, immediately over the heart. It was in this hollow that the heart could be seen pulsating during life. The serous membranes of the heart and lungs were all healthy.

The right lung was compressed to about one-fourth of its natural size, presenting the appearance which it does when hydrothorax is present, for it was excessively congested, and almost impervious to air; very much consolidated, but not from inflammatory effusion. The left lung was also diminished in size, but to not more than half the extent of the right; it was likewise much congested. The heart was natural and full of blood.

Abdomen.—Intestines tympanitic, venous congestion of the liver; spleen small, and rather sanguine; pancreas healthy.

The lacteals were distended with chyle, which presented the ordinary granular appearance of this fluid.

The thoracic duct was almost empty; the fluid which it contained consisted of granular matter similar to that of the lacteals, and also some chyle-globules, which were of the usual character. Different parts of the sympathetic nerve were examined, but they presented nothing unusual in their appearance.

The left kidney contained a calculus of considerable size, which, on examination, was found to consist solely of phosphate of lime.

Female organs healthy.

Sections of the bones.—The bones of the skull were not thickened; they were very vascular and soft, though by no means so much so as in the first case; they contained, in small quantity, the same kind of red substance which was observed in the former case. Their sections exhibited a similar open, reticulated texture as that in the skull in the first patient.

A section of the radius exhibited very beautifully the progress of this disease; at both extremities there was merely an unnatural degree of vascularity, though the vessels forming it were not very red. The head of the bone was more injected than the lower end

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of it; at the lower part of the upper third, the cancellated structure had been partially absorbed, and its place occupied by the red grumous matter. So little of the earthy matter had been removed, that the bone retained nearly all its natural firmness.

Sections. The sternum.—Externally this bone did not seem much altered in firmness; it was not at all altered in form. But internally the disease had advanced rapidly, absorption of the earthy matter having taken place in patches, and the red substance occupied its place. The appearance it exhibited has been very beautifully represented by Mr. Kearney.

Ribs.—It was evident from the external form of these bones that they were extensively diseased. Only one was divided, which was interesting, from its showing the disease in various stages of development.

Spine.—The same appearance in these bones as in the rest.

Thigh-bones.—The right one alone was divided, and in this the disease had made such progress in the centre of it that the whole of the osseous matter had been removed, and nothing but periosteum and membranous matter left; while at the upper part of the lower third of the bone the red matter was abundant, exhibiting various hues, from a deep Modena red to a bright scarlet crimson, the osseous laminated shell remaining, but almost as thin as a wafer; then towards the condyles a portion of the bone was nearly of its natural color, only yellower and softer, from an abundance of fatty deposit. The extremity of the bone, to the extent of about one-third of an inch, was of a bright red color, contrasting beautifully with the clear, healthy color of the cartilage. This redness was evidently the effect of inflammatory injection of the vessels.

A section of the head, neck, and upper third exhibited, to a certain extent, the same appearance as a corresponding section in the case of Caroline Stephens. There was, however, a difference of considerable interest, in a pathological point of view, in illustration of the course of the disease.

The cells which contained the red matter were distinct throughout the section, but in some of them this matter had become entirely absorbed; a transparent serum occupied its place. The head of the bone was completely hollow, and filled with serum; there were two other smaller cavities at the lower portion of this part of the bone, filled in the same manner.

The red matter I examined carefully under the microscope, with

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my friend Mr. Birkett, of Guy's, who has drawn up the following report of his observations:—

"From the cellular spaces of the cranial bones a soft, reddish, gelatinous solid could be removed. It mingled readily with water, rendering the fluid turbid. In it I could see cells with nuclei of two kinds. The first round, and clearly exhibiting a nucleus and nucleolus; they were, however, few in number, and certainly could not be said to compose the mass of the solid, which apparently contained a delicate fibre of fatty matter. The second kind were very clear, their edge being remarkably distinct, and the clear oval outline inclosing *one* bright *central* nucleus, *rarely two, never more.* There was a tendency to elongate into the caudate cells, but this appearance was very rare. Many other cells of irregular figure and shape, some with, others without central nuclei, existed.

"Large cavities existed in the body of the vertebræ, filled with a dull, oily, reddish matter, and which contained a great number of cells having an irregular outline, and some a very distinct nucleus, rendered more distinct by dilute acetic acid. I could find no distinctly caudate cell, as in the cranial bones, and the identity of these cells with pus-globules (for they appeared larger than pus-globules commonly are), or the commonly called nucleated cells of malignant disease, was difficult to determine; in the femur I saw nothing but fat-cells and blood-disks."

"The red colored matter in the bones," says Mr. G. Rainey, of St. Thomas's Hospital, who also examined it, "consists of a multitude of roundish bodies, almost the size of the blood corpuscles, each of the bodies being filled with a minutely granular substance. Besides these bodies it contained also fat globules, but no regular fat vesicles, and it appeared to be wholly destitute of any fibrous or cellular structure."

Mr. Simon, of King's College, examined portions of the bones, and thus expressed himself in a note to me on this subject: "My examination was not at all satisfactory as to the ultimate nature of the disease. There was great excess of the natural fatty matter, and disproportion of the medullary cells to the substance of the bone; in parts there was apparently extravasation of blood, which may have arisen from violence. I was unable to discover any new cell formation, at least any mature one; cytoblasts were exceedingly plentiful, so as to suggest the probability that some such formation was in progress, but nothing further, with the exception

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of some two or three apparently detached young fat cells. Decidedly there was no show of growing cartilage."

After a careful consideration of all the facts, and especially by comparing the appearances after death with the symptoms during life, of this awful disease, Mr. Solly was led to believe that it is of an inflammatory character, that it commences with a morbid action of the bloodvessels, which give rise to that severe pain in the limbs invariably attendant on this disease, but more especially in its commencement, and exhibits itself after death by an arterial redness of the parts. The absorbent vessels are at the same time unnaturally excited, and the earthy matter of the bone is absorbed and thrown out by the kidneys in the urine, which excretion is sometimes so abundant, as we have seen in the last case, that it clogs up the calices and pelvis of the kidney and forms there a solid calculus.

Mr. Solly concluded that the enormous hypertrophy of the bones of the skull in his first case, as also in that of Madam Supiot, demonstrated that it is an active disease, and not a mere atrophy. Indeed, he supposed that the inordinate vascularity of the bones of the skull, though unaccompanied by increase of thickness in his second case proves nearly as much; and he had no doubt but that if this patient had not died so suddenly, but had survived another twelvemonth, a similar thickening of the skull would have taken place. It is interesting, in relation to the pathology of the brain, to observe the effect of this disease of its solid covering in the case of Stephens, where the intellect was deranged. Whereas in the latter instance recorded by Mr. Solly, the mind remained perfect to the last, where the skull was not altered in its dimensions.

Dr. Thomas Blizard Curling has recorded the following case of mollities ossium, under the head of Eccentric Atrophy of Bone:—

Case IX.[1]—Catharine Burne, aged 72, was brought to the London Hospital from the workhouse at Poplar, February 18th, 1833, in consequence of a fracture of the right femur. She had been an inmate there since the 18th of September, 1827, and had been bedridden for nearly four years, on account of paralysis of the lower extremities. The hip and knee-joints had been in a state of flexion so long that it was impossible to straighten them, and for some

[1] Observations on some of the Forms of Atrophy of Bone. By Thomas Blizard Curling. Medico-Chirurgical Transactions, 1836, vol. xx. pp. 356–373.

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years she had experienced great pains in the knees and thighs. She had been subject to hysteric fits, also to a slight cough, and ever since her last confinement had been troubled with incontinence of urine, in which secretion nothing peculiar had at any time been remarked. Her appetite had always been good. On being turned in bed by a nurse, on the morning of the day that she was sent to the hospital, her right thigh was suddenly fractured.

About a fortnight after her admission, whilst being moved in bed, her right humerus was also broken. The arm was placed in splints, but from this time she gradually sunk, and died on the 19th of March. On examining the body, the lungs, abdominal viscera, and mesenteric glands were found healthy, but the heart was rather flabby. There was considerable calcareous deposit in the lumbar and iliac glands, and a fistulous communication between the vagina and bladder. Between three and four ounces of serum escaped from the cavity of the arachnoid; and between the layers of that part and the dura mater covering the upper surface of the brain, some tubercles were found. All the articulations were in a healthy state. The periosteum was everywhere normal, except over the trochanters, where it was entirely detached, owing, most probably, to inflammation induced by the pressure to which they had been so long subjected. The bones of the skull and pelvis might be cut with a strong knife, but the ribs and vertebræ were only slightly affected, being scarcely less firm than usual. The femur consisted of a thin shell of bone filled with medulla, its cellular structure being entirely obliterated, except in the head of the bone and at the trochanters, where there was a slight appearance of cancelli greatly enlarged. Some dark spots were observed at different parts of the interior, which were found to be produced by extravasated blood. The fractured extremities of the right thigh bone had a slight ligamentous connection. The tibia also consisted of a mere shell of bone, elastic, and yielding under the finger like a thin piece of ivory, the cancelli being removed, and the interior likewise filled with medulla. Although only a thin lamina of bone remained at their extremities for the attachment of the articulating cartilage, that structure was not in the slightest degree affected. The tarsal and metatarsal bones, and the bones of the phalanges of the toes were much less firm than in the natural state, and their cellular texture enlarged. The humerus was firmer than the thigh bone; it did not yield to pressure, and in order to make a section of it, the use of a saw was necessary; whereas all the bones of the

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lower extremities could be readily cut with a knife. The walls, however, of the bones of the superior extremities were preternaturally thin, and their medullary cavities evidently enlarged. Upon making section of the different bones, patches of a light-red color were remarked at different parts, and these, upon inspection with a magnifier, were found to arise from the minute vessels of the medullary membrane being highly injected with red blood. The oily substance with which the bones were filled closely resembled the medulla of an old subject, and several of the bones having been placed for some months in water to macerate, it was converted into adipocire, a beautiful specimen of which was afforded by a section of the humerus.

It is to be regretted that it was impossible to obtain a fuller account of her state of health, and of the different secretions at an earlier period of the disease.

From a review of all the circumstances connected with this and other forms of atrophy of bone, Mr. Curling concludes that the wasting of the osseous tissue is here the result of defective nutrition, and not of increased activity in absorption. If it were owing to the latter action, continues Mr. Curling, we should expect that the wasting process would go on most rapidly in the cancellous and vascular parts of bone, whereas we find that the denser parts, and those of inferior vascularity, are most rapidly removed.

Again, the disease appears first in the bones of the lower extremities, for the same reason, probably, that all morbid changes consequent upon defective nutrition, or a feeble circulation, commence oftener in the depending parts.

According to Mr. Curling, the various appearances presented by the medulla which is sometimes described as vitiated, or as being of a reddish color, and resembling flesh, liver, or tallow, is owing to slight modifications in the secretion, together with some degree of increased vascularity in the medullary membrane, or to the medulla being mixed up with blood accidentally effused, as would readily happen if there was much distortion. Mr. Curling was satisfied, from his examination of the bones in this disease, that the matter with which the bones are filled is nothing else than an increase of the true medulla, somewhat altered in appearance, but very slightly in its essential characters.

M. Saillant, in a case which he brought before the Faculty of Physic in Paris, in 1792, calls the disease medullary gout. Indeed, rheumatism has frequently been considered as giving rise to

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it. All the cases have been accompanied with severe pains in the limbs, and many of them preceded by severe rheumatic attacks. M. Kilian asserts that the most common exciting cause is violent cold, produced by getting wet through, especially during menstruation, or the presence of the lochia; he also enumerates sudden fright, grief, misery, and poverty. The most severe cases, according to this author, occurred in women confined in damp prisons.

Mr. Howship remarks in reference to this disease, that it is "the effect of a morbid action in the capillary's arteries upon the medullary membranes within the bone; and most probably the progressive absorption of the bone itself was merely one of the consequences of the long continuance of the malady."[1]

If the view expressed by Mr. Solly be true, that mollities ossium is of an inflammatory character, it is evident, however, that the altered state of the osseous tissue is essentially different from that which commonly occurs in inflamed bones. Thus, in inflammation of the bones, the periosteum is always more or less involved, and the appearance of extravasation of blood in mollities ossium may arise, in part at least, from the fractures and distortions of the bones.

It is well known that in bad cases of scurvy the bones occasionally become so brittle that they are broken by the slightest causes, and do not unite again by callus, as long as the scorbutic state continues. And in some cases of scurvy the callus of old fractures is destroyed after it had been formed. Boyer, in his *Lectures on the Diseases of the Bones*, states, that if the bones of a scorbutic person be boiled, the periosteum separates very soon, lamellæ scale off, and, in some cases, the bone dissolves entirely. They also fall into powder if kept for some time, but particularly if exposed alternately to heat and moisture.

It is also well established that in this peculiar state of the system induced by sameness of diet, and salt food, the smallest injuries, and even vaccination, may be attended with the most extensive and foul sloughing and gangrenous ulcers, involving in one common destruction integuments, muscles, nerves, vessels, and bones.

The origin of this state of the system is clearly referable primarily to changes induced in the blood, and secondarily to the perversion of nutrition and the degeneration of the solids.

In like manner it would appear to be more philosophical to refer that peculiar state called mollities ossium, to derangement

[1] Edinb. Medico-Chirurgical Transactions, vol. ii.

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of the blood and nutritive processes in its origin, rather than to a peculiar disease of the bones, originating solely in the osseous system. In many of the cases there would even appear to be some connection between this disease and scurvy. The case related by Mr. Goosh and Dr. Pringle to the Royal Society in 1753, had symptoms of scurvy, and bled much at the gums. Madame Supiot, for two years before the disease commenced, had been in the habit of eating a pound or a pound and a half of common salt in the course of a week, without any vehicle. In this case the gums swelled much, and were separated from the teeth, allowing them to fall out. In the case of Sarah Newbury, there was no bleeding of the gums, but the teeth became loose in consequence of the softening of the maxillæ.

Again, the disease is frequently attended with symptoms of a remarkable kind, which can only be referred to changes in the blood and vascular system. Thus, in the case of Madame Supiot, it was noticed that, when the bones were softening, the urine deposited a white, chalky sediment, which came away after her pains, and ceased towards the termination of this protracted case, when scarcely a bone remained for the disease to prey upon. Both the urine and saliva stained the linen black. In the case of James Stephenson, recorded by H. Thompson in his *Medical Observations and Inquiries* (vol. v.), for the first two years of the disease, the urine deposited a whitish sediment, which, upon evaporation, became like mortar, and the patient, a shoemaker at Wapping, voided three or four small jagged stones some time after a complaint in his loins.

In the case related by M. Saillant, the urine was high-colored, turbid, and fetid, and the hands and feet were constantly covered with an unctuous humor, which, as it dried, thickened into scabs. In the case reported by Mr. Howship, the perspiration was abundant, and possessed an unusual fetid odor. In another case reported by M. Saillant there were copious sweats, and an almost incessant salivation.

All these circumstances seem to indicate that the blood was loaded with something which was necessary to be eliminated by the skin, kidneys, and salivary glands.

These symptoms sustain the view advocated by Meischer and others, that the earthy parts of the bone, after being absorbed, are excreted with the urine, in which they deposit a white sediment, cretaceous and soluble in acids, and that this solution of the earthy parts of the bones is dependent on an acid diathesis, as exhibited in acid eructations, vomiting, and sweats.

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CHAPTER III.

RELATIONS OF MOLLITIES OSSIUM TO FRAGILITAS OSSIUM.

WHILST it is true that the bones become fragile in certain stages of mollities ossium; and whilst a certain degree of fragilitas ossium occurs in old age, and in some cases in the latter stages of syphilis, and in certain cases of cancer, where the whole mass of fluids is infected, and the virus attacks the bones, destroys the vital parts, and renders them brittle—at the same time there is a true fragilitas ossium, distinct from these diseases and from mollities ossium.

I have enjoyed the rare opportunity of seeing these two diseases at the same time and in the same place, and of comparing the two diseased actions.

The following case of fragilitas ossium came under my observation in Nashville, just at the time when I was treating the case of Miss Raney Drucilla Bozel.

CASE X.—Marshall Lewis; dark mulatto; age, 24; Nashville, Tennessee, 1868. His father and mother stated that, when about two years of age, Marshall was attacked with typhoid fever in the fall of the year, during an epidemic of this disease which prevailed in the neighborhood. The case was somewhat protracted, and the attending physician administered calomel daily in small doses. The child recovered entirely, and enjoyed good health. When three years of age, Marshall accidentally fell out of the door (the house being built on the ground and low), and caught on his hands. His legs striking the door-sill, were fractured short off about the middle. The attending physician set the legs in pasteboard splints, and directed that they should be wet with vinegar, which caused the splints to slip off, and the bones of both legs united irregularly. Since this time he has had numerous fractures, numbering in all near *fifty*. The slightest fall produces fractures of the leg or thigh-bones. Several fractures have occurred during play.

At the present time Marshall enjoys excellent health; has never been sick, with the exception of the attack of typhoid fever.

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Weight, 150 pounds; has weighed near 170 pounds, but at that time was more active in his habits (followed his trade of boot-making) than at the present time, when he leads a sedentary life, studying his books diligently and endeavoring to acquire an education.

Chest large, full, and well developed, with powerful muscles. Height of Marshall, 4 feet 4¾ inches. Breadth of shoulders, across from the outer border of one humerus to the outer border of the other, 18 inches. Circumference of chest, 40 inches. The well-formed chest is supplied with powerful pectoral muscles, and long, muscular, strong arms. Length of body from crest of ileum to top of head, 26 inches; from crest of ileum to bottom of head, 26¾ inches. The latter measurement is not one-half what it should be, owing to the numerous fractures and bending of the legs and thighs. Arms powerful and long; length of arm from shoulder to end of wrist, 32 inches. Hands large and powerful. Right forearm has been broken near the wrist-joint, and in the elbow-joint, which is considerably deformed. The left forearm has been fractured twice.

The great size of the muscles of the arms and chest appears to be the result of the constant use of crutches in walking—cannot walk without crutches.

The thighs have been fractured so often that they are bent like bows. The leg bones were in early childhood broken about the middle, and the upper fragments projected anteriorly, forming almost right angles with the lower fragments; and the ends of the projecting bones are covered with a hard, thick, shining, horn-like skin, although they do not strike the ground in walking. The length of the right thigh is only 15 inches, and that of the right leg about 16 inches. Feet quite small; the patient wears No. 2 shoes. Length of foot, 8 inches; breadth across sole of foot, 3¼ inches. Thighs, although misshapen and bent like a bow, with large masses of callus thrown out along the femur, are still large and muscular, whilst the muscles of the legs are greatly wasted.

The parents were disposed to regard the brittleness of the bones as due to the typhoid fever and calomel, but nearly one entire year had been passed in good health before the appearance of the fragilitas ossium; and in addition to this, in reply to various inquiries relating to constitutional and family diseases and tendencies, I was informed that the niece of Marshall's father has had numerous fractures, being afflicted in a similar manner with Marshall,

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although she has borne children and is apparently stout and healthy.

Mother of Marshall, a powerful, hardy, black negro woman, age 52, has had twelve children, all of whom were vigorous and strong. Those of her grown children whom I have seen are large and healthy. Father of Marshall, a stout, light mulatto man, 52 years of age.

The points of interest presented by this case, as distinguishing it from mollities ossium, were:—

1st. The fractures were attended with little or no pain, and healed rapidly by the formation of callus.

2d. The general health of Marshall Lewis appeared to be perfect, and there were no marks of cachexia or of a scrofulous or syphilitic taint.

3d. The appearance of the same brittle state of the bones in a niece of his father's indicated a constitutional origin of the disease, or rather that the brittleness of the bones was hereditary.

Dr. Paull, of London, has recorded a striking illustration of the hereditary brittleness of bones and their repeated fracture in members of the same family. All the members of a family residing in the commune of Offenbach have had fractures; three of them have each had two fractures; another three; one has even had as many as five fractures of one or the other extremity; and to produce these injuries no considerable violence was in general requisite, The father and grandfather before them had fractures of the limbs. Dr. Paull, moreover, described this family as a very healthy one, without any scrofulous or other perceptible taint. It is remarkable that not one of them suffered a fracture before the age of eight, so that one might suppose that this peculiar fragility of the osseous matter was developed only towards the age of puberty. Dr. Paull conceived that the condition of this fragility consisted in some change of the chemical constituents of the bones in their relations to each other.

It has been frequently observed that men addicted to the use of brandy often experience fractures (in consequence of a degree of brittleness induced in the bones), which require a long course of treatment to insure their consolidation. Dr. Paull met with this fragility of the bones in a subject of this kind, a man 54 years of age, who hung himself at Yorchlengen; the ribs, particularly snapped like glass, and a very moderate force sufficed to fracture the long bones. But if fractures in these old drunkards are cured

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only very slowly, precisely the contrary was the case in the family above mentioned; for in every instance that occurred in it the fracture was very speedily consolidated, so that generally the callus was perfectly firm at the end of three weeks. When the same bone has been broken a second time, it has never occurred at the seat of the callus.[1]

We are justified by these cases in assuming the position that there is a state of the osseous system correctly indicated by the term fragilitas ossium, which cannot be referred to the syphilitic, scrofulous, or cancerous cachexia, and which exists with perfect health, and the repeated fractures are rapidly united by callus.

CHAPTER IV.

RELATIONS OF MOLLITIES OSSIUM TO RICKETS (RACHITIS).

Upon a superficial view, rickets and mollities ossium appear to be closely connected on account of the flexibility of the bones and the fractures upon slight causes which characterize both diseases. Some authors, led by these general resemblances, have regarded the latter disease as rickets attacking the adult. A careful analysis and comparison of the phenomena of the two diseases, however, will show that the resemblances of the two affections are far exceeded by their differences.

A deficiency, actual and relative, of phosphate of lime in the osseous system, characterizes both mollities ossium and rickets; in the former, however, the skeleton, originally normal in structure, loses its earthy matter, becoming fragile, soft, and pliable; in the latter, the osseous structure is abnormal from the first or from an early age. Guérin found that of 346 cases of rickets, 209 were affected between the first and third year, these were congenital; 34 occurred between the ages of four and twelve; 148 were males and 198 females. Cases of congenital rachitis have been mentioned by Hippocrates and other writers.

[1] Dublin Hospital Gazette, Feb. 1st, 1846. Ranking's Half-Yearly Abstract, vol. iii. p. 83, 1846.

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Mr. Tamplin[1] has described a skeleton affected with rickets in a seven months' fœtus. Rickets has been observed in the young of wild animals (lions and tigers) born during the captivity of their parents. The disease appears to be intimately connected with a marked cachexy of the system, which seems to be identical with the scrofulous, and to be induced by insufficient nourishment, combined with bad hygiene, and damp, foul air. The process of dentition also, by the disturbances which it causes in the alimentary canal, and by the drain which it establishes upon the mineral constituents of the blood, tends to develop and aggravate the disease.

On the other hand, mollities ossium attacks adults, and especially women after they have commenced child-bearing. In the sixteen cases collected by Mr. Curling,[2] thirteen occurred in females, and only three in males; eleven were fatal between thirty and forty; in none did the disease show itself before puberty; but two patients were above fifty years of age, and several of them were delivered of children during the progress of the complaint.

The softening of the bones is slow and gradual in rickets, and unaccompanied by pain, while in mollities ossium it is sudden and rapid in its progress, and accompanied with great pain.

Sir Charles Bell,[3] in his *Lectures, illustrated by the Hunterian Preparations*, quotes from the "Medical Observations and Inquiries" a remarkable case of mollities ossium, where a man going up stairs struck his toes against a step, and broke his thigh-bone. The surgeon attended, with all proper appliances, to the thigh-bone, but the usual period expired without union being discovered at the fractured part. A consultation being called, on raising the leg the thigh-bone broke again in the hands of the surgeons. The disease proceeded to such an extent that the flexor muscles twisted the bones, so that the heels were drawn back of the head, and the trunk itself, before death, became greatly flexed.

Mollities ossium progresses, in almost all cases, to a fatal issue; in rickets, after a time, the abnormal condition is cured by treatment, or the progress of age; earthy matter is deposited in even more than its due proportion, the skeleton becomes solid and strong, and the general health may be entirely restored.

If the patient outlive rickets and die afterwards, it will be found,

[1] Lectures on the Nature and Treatment of Deformities. Am. ed. pp. 156–157.
[2] Medico-Chirurg. Trans., vol. xx. p. 336.
[3] London Lancet, March 15, 1834, p. 918.

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upon dissection, that the bones have assumed great weight and density, and, in some instances, the cavities of the cylindrical bones are said to have been filled up with earthy matters. And it has been noticed, in some instances, that such persons on recovery from the disease, acquire a surprising degree of strength. Sir Charles Bell[1] mentions an individual by the name of Farrel, known on the streets of London as "Leather-coat Jack," who would throw himself under a hackney-coach, and allow the wheel to go over him, for a pot of porter. This short, deformed man, who had been afflicted with rickets in his youth, exhibited great feats of strength, bearing an anvil on his breast, and carrying the tallest men by placing his arms under their thighs. Sir Charles Bell also cites the extraordinary manifestations of strength by another dwarf, and rickety subject, called the "Little Hercules."

The general health in mollities ossium is hopelessly impaired, the flesh and strength diminish daily, and in some cases the muscles undergo fatty degeneration. The observations thus far recorded have not been sufficiently numerous or accurate to decide the question whether the degeneration of the muscles is always present in this disease. The fatty degeneration of the muscles in those cases in which it has been observed can with great reason be referred to the action of the same causes which induced the softening and degeneration of the bones.

The pale color of the muscles in some cases of rickets appears to be due to the anæmic condition of the system, rather than to fatty degeneration of the muscles; and we have just seen that after recovery from this disease, the muscular strength, so far from being impaired, is often wonderfully increased.

In mollities ossium, the loss of earthy matter in the osseous system is rapid, and is frequently attended with a copious phosphatic deposit in the urine, and the bones do not simply lose their earthy constituents and become reduced to their cartilaginous flexible tissue, but there is an actual change in the living cellular elements of the bones, and a progressive degeneration, so that in many cases, the bones consist finally of an external shell filled with oily or lardaceous matter held in membranous tissue. Though pathologists are still in doubt as to the exact nature of the change of the osseous system in this disease, the observations of Mr. Solly and of Mr. Dalrymple have shown the existence of a process of active

[1] London Lancet, March 15, 1834, p. 918.

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change, as manifested in the afflux of blood to the parts affected, and the abundant cell growth. Mr. Dalrymple has found, by microscopical observation, that the bone corpuscles are considerably enlarged. Enlargements of the Haverseian canals and of the lacunæ is observed; the cancelli are loaded with large oil drops, often tinted red, and, combined with thin, numerous cells, varying in size from the $\frac{1}{1200}$ to $\frac{1}{500}$ of an inch in diameter, containing a rounded nucleus, also varying much in size, and occasionally showing various stages of division and of endogenous development. And whilst there is a diminution of the earthy constituents, there is at the same time some important change in the animal basis of the bone; it no longer yields healthy gelatin, and is saturated with oil, which, to a great extent, is not contained in cells, but lies as a free fluid in the cancelli and medullary canal, and readily drains out, when the bone is placed in an inclined position. The color of the oil is also peculiar, presenting bright yellow, pink, and deep crimson hues. These changes are probably owing, as Bennett has said, to an exudation from the bloodvessels, mingled with more or less extravasation of the colored corpuscles, in which new cells are developed, combined with fatty transformation of the albuminous and fibrinous materials.

Virchow has traced fatty degeneration in inflamed bone as a part of the process of softening which precedes its expansion or absorption. Very often small fatty molecules appear in the bone-corpuscles; and Virchow has traced their enlargement, and the gradual softening, disintegration and final liquefaction and separation of the proper bone-substance immediately surrounding and including each corpuscle. Analogous changes have been traced by Goodsir and Redfin in cartilage; and Virchow has pointed out their relation to fatty degeneration as a part of the inflammatory process. And these changes in inflamed bone are of special interest, inasmuch as they are the results of the same process as that by which normally the medullary spaces and areolæ of growing bone are formed, and by which mollities ossium is supposed to be produced.

On the other hand, the softening of the bone in rachitis should be regarded as arrested development of bone, with an increased growth of cartilage-cells. In this disease the whole bone is soft, easily cut with a knife, and preternaturally flexible; cancellous texture of a brown or reddish hue predominates, and is at first filled with a serous liquid, which may be squeezed out, as if from

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wet leather; after some time the serous or albuminoid liquid occupying the tube and cancelli is transformed into a gelatinous substance, which is gradually organized into a cartilaginous state. The power to separate and deposit bony or earthy matter appears to be entirely wanting in the organic cells of the osseous system in mollities ossium, whilst in rachitis this power is only temporarily suspended or arrested, and is resumed with increased energy after the removal of the diseased state.

CHAPTER V.

RELATIONS OF MOLLITIES OSSIUM TO CANCER.

MOLLITIES OSSIUM, in that, as far as is known, it is not amenable to remedies, but pursues its career steadily, unaffected for good by medical treatment; and in that there is in this disease an increased cell-generation in the affected structures; and, still further, in that, in recorded cases of cancer, some of the bones have been found in a state closely resembling, if not identical with mollities—bears a stronger resemblance to cancer than to any other disease.

The brittleness of the bones in cancer has long been observed. Thus, the celebrated Levesius, more than a century ago, in dissecting the body of a woman sixty years of age, who had labored for some time under a cancer of the breast, and who had broken the os humeri, and, soon after, the os femoris also, by a slight effort, found the bones not carious, but dry and fragile, with the medulla, in like manner, dry, friable, and quite loose from the parietes of the bony cavities.

In a case which recently came under my observation in the Charity Hospital, of cancer of the breast in an aged negro woman, several of the ribs on both sides were soft, cartilaginous, and readily cut with a knife. Cancerous deposits were found also in the liver and spleen.

In the following case, recorded by the celebrated Percival Pott, it will be observed that softening of the bones was attended with fever, great muscular debility and pain, and the formation of steatomatous and scirrhous tumors.

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CASE XI.[1]—In November, 1737, a gentleman, aged 27, complained of a swelling in the inside of his right thigh. On examination, it appeared to be an encysted tumor of the steatomatous kind, lying loose between the sartorius and vastus internus muscles. Mr. Pott took it out, and the patient got well in six weeks. After this he continued well for near a year, except that he complained at times of a slight pain in the joint of that hip, which went off and returned at different times. He then fell into such a disposition to sleep, that no company nor diversion, nor his own endeavors to the contrary, could keep him awake after eight or nine o'clock in the evening, if he sat down. This continued on him for three or four weeks, and then the pain in his hip became worse. The cold bath, flesh-brush, horseback exercise, a course of æthiops mineral, cinnabar, of antimony, gum guaiac, calomel, purgatives, and mineral waters, as well as travelling and change of climate, afforded no relief. Periodical heat and thirst returned every night, with a quick, hard pulse.

In September, 1739, the sight of his left eye became dim, and the dimness gradually increased until the sight was lost, and the ball of the eye was enlarged and thrust forward out of the orbit.

Tumors appeared in different parts, five or six on his head, two or three in his back, and one in the neck, all lying just under the skin.

December 2d, 1739, his chief complaints at this time were excessive languor, inability to move his right hip, and when moved by another person, a very acute pain in it, an incapacity of sleeping when in bed, an intense thirst in the night, with a quick hard pulse.

After subjecting himself to several courses of treatment, with cinnabar, of antimony, mercury, and other remedies, without any benefit, and being reduced extremely low, he abandoned physic. The inguinal glands of the hip became much enlarged, the patient lost all power of stirring or helping himself, and died May 2d, 1740.

For a considerable time before he died he was nourished by fluids only; yet as soon as ever they were received into the stomach, in however small a quantity, they gave him acute pain at the bottom of his belly, just above the pubes. Upon dissection, Mr. Pott found

[1] An Account of Tumors which rendered the Bones Soft. Communicated to the Royal Society by Mr. Percival Pott, Surgeon, 1740. Vol. xli., No. 459, p. 616. Abridgment, vol. viii. pp. 464–467.

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the tumor which he had taken out of his thigh two years before ossified in the inside.

On dissection, the first thing that offered was a large tumor on the sternum, which had been perceived about three months before he died. It was as large as a turkey's egg, and so hard and immovable that Mr. Pott was in doubt whether it was upon or under the bone. On removing the skin, it appeared covered by the expansion of the tendons of the intercostal muscles and the periosteum; this coat being taken off, it was of a suety kind of substance for about half an inch deep, and below this was a kind of cartilage intermixed with a great many bony particles. Mr. Pott then shaved off all this diseased body even with the surface of the rest of the sternum, but found no bone, it being quite dissolved and confounded with the mass of matter that composed the tumor, which was equally protuberant within the thorax, and composed of the same materials.

Parts of the fifth and seventh ribs were dissolved in the same manner, into a kind of substance between bone and cartilage, with a thin coat of steatomatous matter.

Within the cavity of the thorax were thirty-seven of these diseased bodies, most of them attached either to the vertebræ or the ribs; and wherever they were attached the cortex of the bone was destroyed, and its internal cellular parts filled with diseased matter.

Immediately above the diaphragm, was a large scirrhous body, lying across the spine and the aorta, the latter of which lay in a sinus formed in its lower part; it had no attachments to any other part, and weighed 13½ ozs.; and from its situation must have taken its rise from *some* of the lymphatic glands lying about the thoracic duct.

From the origin of the aorta from the heart quite up to the basis of the cranium, all the bloodvessels were surrounded with these scirrhous bodies, and the thyroid gland was diseased in like manner, and bony within. On the left side was another of these bodies, made out of the glandulæ renalis, weighing 9¾ ozs.

On the right the glandulæ renalis was in a natural state, but the cellular membrane which surrounds the kidneys was filled with a large cluster of these bodies of different sizes, some of them entirely suety, others intermixed with bony particles; three or four of them were attached to the body of the kidney, and there was a sort of cartilage beginning to ossify.

The pancreas was quite scirrhous and very large. One very

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large tumor sprang from the spongy body of the third vertebra of the loins, the bony texture of which was so dissolved and mixed with the matter of the tumor, that the knife passed through it with great ease. The inner side of the os ilium, all the ischium and pubis, were covered with these appearances, and on removing them the bone was found in the same state as the sternum and ribs. The middle of the right os femoris was surrounded with a mass of the same matter, and the bone underneath in the same state.

In the bottom of the orbit, surrounded by the recti muscles, was a pretty large steatoma which occupied the protrusion of the eye, and by pressure on the optic nerve caused the blindness.

In diffused cancer the whole bone may be softened by the distension of its cells with the material of soft cancer, the cancelli may be partially or completely absorbed, and general disintegration of the bone induced. And it would appear that some cases described as mollities ossium were really instances of diffused cancer of the bones. And in the close resemblance of the two affections must be found the grounds upon which some authors have classed mollities with cancer. This confusion is not to be wondered at when the obscurity and difficulty which surround the history and investigation of cancer of the bones are considered.

Professor R. W. Smith, of the University of Dublin, has recorded a remarkable case of cancer in the bones, a brief outline of which we give.

CASE XII.[1]—The patient was a female, æt. 63, of sallow complexion and very unhealthy appearance.

Four years before her death, and eight after the catamenia had ceased, she began to suffer from lancinating pains in the left breast, and a small hard tumor formed near the nipple, and very soon became adherent to the skin, was uneven upon the surface, and after some time the axillary glands became enlarged and indurated. The tumor underwent no further changes for two years and a half, when a scab formed upon its surface, upon the separation of which, a very superficial ulcer not as large as a shilling remained; this sore never increased either in extent or depth, and yielded but little discharge. In fact, during the remainder of her life, the diseased breast attracted no share of her attention, and the lanci-

[1] Dublin Hospital Gazette, March 15, 1855; Ranking's Abstract, No. XXII., July to Dec. 1855, p. 113.

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nating pains which were first experienced latterly ceased altogether. Severely, however, and almost unceasingly, did she suffer from pains, which she conceived to be of a rheumatic character, in all her bones; she had cough and pain in the right side; her appetite failed, her sleep deserted her, and her flesh wasted away; she was for a long time before her death completely bedridden; she could not endure that any one should touch her; and her efforts to move herself in the bed were, upon several occasions, followed by fracture.

She died exhausted by pain and suffering and in a state of complete emaciation.

The post-mortem examination, which Dr. Smith conducted with the greatest care, proved most interesting, and revealed an immense extent of cancerous deposit limited to a single system; for, with the exception of a tubercle about the size of a small nut in the liver, the organs, in all the cavities, were perfectly healthy; while, upon the other hand, nearly the entire skeleton from the head to the feet was pervaded with cancer.

The cranial bones in several places had been softened and absorbed; the left clavicle was fractured external to its centre, and the anterior of the bone was occupied by scirrhous matter, from its sternal to its acromial extremity; the left humerus was broken in its centre, and the cancerous deposit filled the medullary canal from the head of the bone down to its lowest extremity; both the right and left thigh bones were fractured and in portions absorbed and universally infiltrated with the cancerous structure—the medulla of the bones of the legs presented a most unhealthy appearance; the ribs contained numerous deposits of scirrhus in their interior, and several of them were fractured; the disease occupied the spinal column from the lower part of the cervical region to the sacrum, the cancellated tissue of the bones had disappeared and its place was occupied by a firm, elastic, scirrhous structure of uniform consistence and of a roseate hue; and the bones of the pelvis were entirely converted into a scirrhous structure.

The characters of this heterogeneous deposit were precisely the same in all the affected bones; it was white, firm, tough, and dense in its texture, highly elastic, and cut like cartilage; it in no respect differed from true scirrhus as it is seen in the human breast. The osseous tissue in contact with it had suffered no alteration but such as resulted from absorption.

It is evident that such a case as the preceding was involved in

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obscurity during the life of the patient and simulated closely mollities ossium in many of its symptoms.

In a case of secondary cancer in the spine and other parts after removal of scirrhus of the breast, reported by Mr. Cæsar Hawkins,[1] the centre of the neck appeared a little sunk forwards, as if the upper vertebræ had been depressed in that position. Upon dissection, the body of the fifth cervical vertebra was very irregular on its surface, and was softened throughout, with much enlargement of the cells of the cancelli, which was filled with a sanguineous pulpy fluid; the two adjoining vertebræ showed a lesser degree of the same morbid structure. Mr. F. Holmes[2] has recorded a case of cancer of the bones after scirrhus of the breast, in which some of the ribs were perfectly flexible; and in a case of well-marked cancer of the pelvis,[3] he found a condition of the innominate bone bearing an almost equally close resemblance to mollities.

CHAPTER VI.

CONSTITUTION OF THE BLOOD, CONDITION OF THE TEMPERATURE, PULSE, AND RESPIRATION, AND THE CHARACTERS OF THE URINE, IN MOLLITIES OSSIUM.

Constitution of the Blood in Mollities Ossium.—As far as our information extends, no analysis has been made of the blood in this disease. The future investigator should direct his attention not merely to the determination of the albumen, fibrin, and red corpuscles, but should endeavor to determine whether any special acid or salt exists in the blood in excessive quantity. A careful search should be instituted for lactic and phosphoric acid, and for lactates and phosphates.

Temperature, Pulse, and Respiration in Mollities Ossium.—In like manner, we have no critical observations upon the state of the temperature, circulation, and respiration in this disease, and we know but little beyond the general observation that the pathological phenomena are attended by fever.

[1] Medico-Chirurg. Trans., vol. xxiv. p. 45.
[2] Path. Soc. Trans., vol. xi. p. 219.
[3] System of Surgery, vol. iii. p. 671.

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Progress and Termination of Mollities Ossium.—The various functions appear to have been duly performed in most cases, unless interfered with by the distortion consequent upon the yielding of the bones; and pathologists have distinctly stated that the internal organs were found in a healthy condition after death, thus showing that the disease is not associated with any particular lesion of important viscera.

The progress of mollities ossium appears to vary greatly, the bones becoming soft in some cases in a few months; more commonly, however, the disease goes on for many years before the death of the patient.

Condition of the Urine in Mollities Ossium.—The observations which we have already recorded establish the fact that the phosphates are frequently in excess in the urine of this disease. We need an extended series of analyses of the urine, collected during definite periods of time (twenty-four hours) and at stated periods in the progress of the disease.

The most complete and interesting examination of the urine in this disease was made by Dr. Henry Bence Jones.[1] It is to be greatly regretted that, in his analysis, Dr. Jones selected an arbitrary quantity (1000 grains), instead of the whole amount excreted during twenty-four hours.

This case was reported both by Dr. William Macintyre[2] and by Mr. Dalrymple.[3]

The following is an outline of the report of this case by Dr. Macintyre.

CASE XIII.—A tradesman, aged 45, came under Dr. Macintyre's care on the 30th of October, 1845. He had suffered for upwards of twelve months from excruciating pains in the chest, loins, and back. When first seen, he was much emaciated; the pain had become fixed in the left lumbar and iliac regions, and the patient, in consequence of the great agony produced by moving the body on the thighs, was constantly in a semi-flexed position. There was exquisite tenderness on pressure at the brim of the pelvis in front. Nothing very satisfactory could be made out regarding the abdo-

[1] On a New Substance occurring in the Urine of a Patient with Mollities Ossium. By Henry Bence Jones, M. A., F. R. S., &c. Philos. Trans., 1848, p. 55.

[2] Case of Mollities Ossium and Fragilitas Ossium accompanied with Urine strongly charged with Animal Matter. Med.-Chir. Trans., vol. xxxiii., 1850.

[3] Dublin Quarterly Journal, 1846, p. 85. Path. Soc. Trans., 1846-7, p. 148.

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minal and thoracic organs, except that the cardiac impulse was too strong, and the præcordial dulness too great, without cardiac murmur.

The patient attributed his illness to a strain, but it appears that for some time previously he had been subject to wandering pains about the breast and shoulders. The urine of this patient was submitted to the examination of Dr. Bence Jones, with the following result. The free acid was increased, the phosphates were in much larger amount than in health, and were loaded with a peculiar form of animal matter resembling albumen in its chemical composition, coagulable by heat, but not by nitric acid.

The following table presents the general characters of the urine, as determined by Dr. Bence Jones:—

Date.	Specific gravity.	Earthy phosphates in 1000 parts.	Reaction.	Precipitates, &c.
Nov. 1, 1845.	1034.2		Slightly acid.	Sediment of phosphate of lime, oxalate of lime, and urinary casts.
" 3, "	1043.2	5.68	Acid.	Urate of ammonia, phosphate of lime, and urinary casts.
" 7, "	1039.6	5.65	Slightly alkaline.	Phosphate of lime, and casts.
" 8, "	...	...	....	Heavy deposit of phosphates.
" 9, "	1037.2	...	....	Loaded with urates.
" 18, "	1039.6	...	Acid.	Urate of ammonia, phosphate of lime, and oxalate of lime.
" 27, "	1031.3	8.05		
" 29, "	1037.9	8.24		
" 30, "	1042.7	11.85	Slightly acid.	No fibrinous cylinders.

The complete analysis of 1000 parts of urine, on the 18th of November, gave—

Water	890.72
New substance (resembling albumen)	66.97
Urea	29.90
Uric acid	0.96
Earthy phosphates	1.20
Chloride of sodium	3.83
Sulphate of potash	2.10
Alkaline phosphates	4.45

The following are the conclusions arrived at by Dr. Bence Jones, after a careful examination of the peculiar albuminoid substance in the urine:—

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1st. This substance is an oxide of albumen, and from the ultimate analysis, it is the hydrated deutoxide of albumen.

2d. In this case of mollities ossium, 66.97 parts of this hydrated deutoxide of albumen were passing out of the body in every 1000 parts of the urine. Hence, therefore, there was as much of this peculiar albuminous substance in the urine as there is ordinarily albumen in healthy blood. As far, then, as the albumen alone is concerned, each ounce of urine passed was equivalent to an ounce of blood lost.

3d. The peculiar characteristic of this hydrated deutoxide of albumen was its solubility in boiling water, and the precipitate with nitric acid being dissolved by heat, and re-formed when cold. By this reaction a similar substance in small quantity may be detected in pus and in the secretion from the vesiculæ seminales.

4. This substance must again be looked for in acute cases of mollities ossium. The reddening of the urine on the addition of nitric acid, might perhaps lead to the re-discovery of it; when found, the presence of chlorine in the urine, of which there was a suspicion in the above case, should be a special subject of investigation, as it may lead not only to the explanation of the formation of this substance, but to the comprehension of the nature of the disease which affects the bones.

This patient died on the 2d of January. On the following day, Dr. Jones saw that the bony structure of the ribs was cut with the greatest ease, and that the bodies of the vertebræ were capable of being sliced off with the knife.

According to Mr. Macintyre, the sternum, ribs, and cervical, dorsal, and lumbar vertebræ were found soft and brittle; the cancellated structure loaded with a blood-red, soft, gelatiniform substance, which, under the microscope, was found composed of granular matter, oil globules, nucleated cells, with a few caudate cells, and blood disks. The thoracic and abdominal organs presented nothing unhealthy. The patient's death took place without any satisfactory opinion having been arrived at as to the nature of the case.

We do not gather from the record of this post-mortem whether the kidneys were diseased; the appearance of the modified albumen may have been due to the existence of Bright's disease of the kidneys. Future inquiries should determine whether this substance is characteristic of mollities, and whether the lactic acid, and

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lactates and sulphates, as well as the phosphates, are increased in the urine.

Marchand[1] analyzed the urine of a child with osteomalacia three days before its death. The fluid was invariably acid, and contained, in 1000 parts—

Water	938.2
Solid constituents	61.8
Urea	27.3
Uric acid	0.9
Lactic acid and lactates	14.2
Phosphates of lime and magnesia	5.7
Other substances and loss	13.7

Not only were the earthy phosphates, in this instance, five or six times as abundant as in health, as was the case in one of the instances of this disease recorded by Mr. Solly, but what is especially interesting, in its bearings upon the nature of mollities, the LACTIC ACID and LACTATES *were greatly increased.*

CHAPTER VII.

COMPARISON OF THE CHEMICAL COMPOSITION OF THE BONES IN MOLLITIES OSSIUM WITH THAT OF HEALTH, AND VARIOUS DISEASED STATES—GENERAL CONCLUSIONS.

NOTWITHSTANDING the comparative simplicity of the analysis of bone, much remains to be accomplished before the true nature of its alterations in various diseases are determined with accuracy. Unfortunately, many analyses of morbid bones are unaccompanied by any minute or accurate history of the case. In such a disease as mollities ossium, it would be of the greatest importance to determine whether, in the resorption of the bone-earth, the strongly basic phosphate of lime is replaced by a less basic salt.

The neglect to ascertain the quantity of the carbonate of lime in the fresh bone, or in the earthy constituents, by the direct determination of the carbonic acid, as well as the employment, in most analyses of bones, of the older method of Berzelius for the deter-

[1] Simon's Animal Chemistry, Am. ed., p. 511.

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mination of the phosphate of lime, has left it doubtful whether it exists in bone at $8CaO, 3PO_5$ or $3CaO, PO_5$.

The following tables will present the most important results obtained by chemists, and at the same time furnish data for the determination of the characteristic changes in mollities ossium.

Becquerel and Rodier give the mean composition of human bone, as deduced from fifty-four analyses, made by different experimenters, as follows:—

Phosphate of lime	54.07
" magnesia	1.20
Carbonate of lime	7.40
Fat	1.35
Soda and salts of soda	0.93
Cartilage	35.05

Lehmann represents the constitution of compact osseous tissue, as deduced from the best analyses, as—

Phosphate of lime	57
Carbonate of lime	8
Fluoride of calcium	1
Phosphate of magnesia	1
Mineral constituents	67
Cartilage	33
	100

The comparison of the composition of the bones in mollities ossium with that of health, reveals the following marked changes:—

1. Increase of fat.
2. Decrease of phosphate and carbonate of lime.
3. Relative increase of organic or cartilaginous matter.

Whilst the fat in healthy bones may vary between one and two parts in the hundred, in mollities ossium, on the other hand, according to Prösch, the fat varies from 5.26 to 11.63; according to Lehmann, from 29.18 to 34.15 parts; according to Von Bibra, from 4.15 to 13.28; according to Marchand, from 6.12 to 9.34; according to Garrod, 20.35.

In health the phosphate of lime may vary in different bones; in the adult, between 54 and 60 parts in the hundred; in mollities ossium, according to Bostock, it reached only 13.6 per cent.; according to Prösch, it varied between 13.25 and 33.66; according to Bogne, it varied between 23.23 and 28.11; according to Ragsby, 17.48; according to Lehmann, it varied from 17.56 to 21.02; ac-

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cording to Von Bibra, from 46.79 to 55.01; according to Marchand, from 12.56 to 21.35.

In health the carbonate of lime may vary in different bones from 7 to 8 per cent.; in mollities ossium, according to Bostock, it reached only 1.13 per cent.; according to Prösch, it varied between 5.95 and 4.60; according to Bogne, between 0.94 and 1.07; according to Ragsby, 6.32; according to Lehmann, between 3.04 and 4.08; according to Von Bibra, between 4.94 and 7.49; according to Manchard, between 3 and 3.70 per cent.

In healthy adult bones the cartilage may vary between 32 and 36 per cent.; in mollities ossium, according to Bostock, it reached 79.75 per cent.; according to Prösch, it varied between 49.77 and 74.64; according to Bogne, between 63.42 and 70.60; according to Lehmann, between 41.54 and 50.48; according to Von Bibra, between 29.17 and 32.54; according to Marchand, between 61.20 and 75.22; according to Rees, the animal matters varied between 67.50 and 73.37; according to Garrod, 58.37 per cent.; according to Buisson, 54.37 per cent.

It remains that a comparison should be instituted between the composition of the bones in health, in mollities ossium, and in various diseased states, in order that we may determine whether these changes are characteristic of the disease under consideration.

The results of some of the most trustworthy analyses, by the best chemists, will be found in the following tables:—

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TABLE.—*Composition of Healthy Bones (Human) according to Von Bibra, Berzelius, Thomson, Marchand, Valentin, and Lehmann.*

Author of analysis.	Subjects.	Bones.	Phosphate of lime and fluoride of calcium.	Carbonate of lime.	Phosphate of magnesia.	Salts insoluble in water.	Cartilage.	Fat.	Soda and chloride of sodium.	Organic matter in cartilage.
Von Bibra,	Male fœtus, 6 to 7 months	Femur	53.46	3.06	2 10	1.00	40.38	traces		
"	" "	Tibia	53.46	3 10	2 00	1.07	40.37	traces		
"	" "	Humerus	53.15	3.05	1.96	1.02	40 82	traces		
"	Female fœtus, 7 months	Ulna	57.63	5.86	1.10	0.60	84.78	0.63		
"	" "	Radius	57 67	5.89	0.99	0.67	34.08	0.50		
"	" "	Clavicles	56.93	5 75	1.07	0 73	34.54	0.96		
"	" "	Scapula	57.13	5 99	1.12	0.62	34.33	0.82		
"	Infant, 2 mos.	Tibia	57.54	6 02	1.03	0 73	33.86	0.82		
"	" "	Ulna	56.35	6.07	1.00	1 65	34.92	1.01		
"	" 9 mos.	Femur	48.11	6 12	0.97	1.23	47.71	1.86		
"	" "	Tibia	48.53	5.79	1.00	1.24	41.50	1 92		
"	" "	Humerus	50 15	6.13	1.00	1.30	39.54	1.89		
"	" "	Ulna	48.06	6.20	1.01	1 24	41.79	1.79		
"	" "	Radius	45 38	5 11	0.95	1 07	45.65	1.83		
"	" "	Ribs	42.32	5.60	0.89	1.09	48.55	1.15		
"	" "	Scapula	42 61	5.08	1.92	1.10	48.36	1.93		
"	Female child, 5 months	Femur	59.96	5 91	1.24	0.69	31.28	0.92		
"	" "	Tibia	59.75	6 00	1.34	0.63	31.34	0.95		
"	Girl, 19 years	Femur	54.78	10 90	1.34	0.83	31.15	1.00		
"	" "	Humerus	54.84	10.82	1.26	0.79	31.37	0.92		
"	Woman, 25 yrs.	Femur	57.12	8.90	1.70	0.60	29.54	1 82		
"	" "	Tibia	57.18	8.93	1.70	0.61	29 58	2 00		
"	" "	Humerus	58.03	9.04	1.59	0.59	29.66	1 09		
"	" "	Ulna	57.52	8.97	1.71	0.67	29.14	1.99		
"	" "	Radius	57.38	8.95	1.72	0 63	29.43	1 89		
"	" "	Ribs	52 91	8 66	1.40	0 60	33.06	2 37		
"	" "	Clavicles	56.35	8.88	1.69	0.59	30.66	1.83		
"	" "	Vertebræ	44.28	8 00	1.44	0.53	43.44	2 31		
"	" "	Fibula	57.39	8 92	1.63	0.60	29.49	1.97		
"	" "	Scapula	54.76	8 58	1.53	0.51	32.90	1.73		
"	" "	Metacarpus	57 77	8.92	1.58	0 61	29 23	1.89		
"	" "	Cranium	57.66	8.75	1.69	0 63	29 87	1.40		
"	Man, 25 years	Femur	59.63	7 33	1.32	0.69	29.70	1.53		
"	" "	Tibia	58.95	7.08	1.30	1.70	30.42	1 55		
"	" "	Humerus	59 95	7.76	1.09	0.72	29 25	1.28		
"	" "	Ulna	59.30	7.35	1.35	0.73	29.98	1.29		
"	" "	Ribs	56.66	6.64	1.07	0.62	33.97	2.04		
"	" "	Cranium	38.43	8.00	1.40	0.90	29 92	1.35		
"	" 58 years	Comp't sub. of femur	58.23	8.35	1.03	0.92	31.47	1.35		
"	" "	Spongy bone of femur	42.82	19.37	1.00	0.99	35.83	1.35		
"	Woman, 62 yrs.	Femur	61 17	4.46	1.29	0.90	28.03	2 15		
"	" 76 yrs.	Femur	57 36	7.48	1.10	0.97	33.16	0.93		
Berzelius,	Human bone	Bones	53.04	11.30	1.16	..	37.17	..	1.20	
Thomson,	Human	Femur	48 67	14.00	0.49	..	39.72	..	2.50	
"	"	Femur	51.12	9.77	0 63	..	35.93	..	0.59	
Marchand,	Man, 30 years	Femur	53.26	10 21	1.03	..	32.25	..	1.17	
Valentin,	" 38 years	Tibia	52 93	7.66	0.25	..	38.02	..	1.10	
Lehmann,	" 40 years	Humerus	56 61	9.20	1.08	..	..	..	1.72	51 52
"	" "	Radius	52 27	9.76	1.06	..	..	..	1.72	33.76
"	" "	Ulna	53.98	9.51	1.07	..	..	..	1.38	33 23
"	" "	Femur	58.93	9 28	1.09	..	..	..	1.44	28.61
"	" "	Fibula	52 99	9.33	1.06	..	..	..	1.44	34 13

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Composition of Bones in Mollities Ossium (Osteomalacia).

	Vertebra. (Bostock.)	Vertebra. (Prösch.)	Costa. (Prösch.)
Phosphate of lime	13.60	13.25	33.66
Phosphate of magnesia	0.82	....	....
Carbonate of lime	1.13	5.95	4.60
Sulphate of lime and sulphate of soda	4.70	0.90	0.40
Cartilage	79.75	74.64	49.77
Fats	....	5.26	11.63

An analysis, by Bogne, of the bones of a man, aged 32 years, who died from osteomalacia, yielded the following results:—

	Scapula.	Radius.	Femur.	Patella.
Phosphate of lime	26.92	28.11	23.50	23.23
Carbonate of lime	0.98	1.07	0.97	0.94
Phosphate of magnesia	5 40	6.35	5.07	5.03
Cartilage and vessels	65.85	63.43	69.77	70.60
Soda, iron, and loss	0.85	1.05	0.69	0.64

Ragsby analyzed a rib in this disease, and found—

Phosphate of lime and magnesia	17.48
Carbonate of lime and salts	6.32
Cartilage, vessels, and fat	76.20
Specific gravity	0.721

After the removal of the fat, Lehmann found—

	1.	2.	3.
Phosphate of lime	36.86	31.71	35.87
Other salts	4.96	7.91	5.68
Cartilage	58.16	60.36	58.4

In two cases of osteomalacia, occurring in persons aged about 40 years, Lehmann found—

	(1)		(2)	
	Femur.	Costa.	Femur.	Costa.
Phosphate of lime	17.56	21.02	18.83	19.14
Carbonate of lime	3.04	3.27	3.83	4.08
Phosphate of magnesia	0.23	0.44	0.54	0.60
Soluble salts	0.37	0.63	0.43	0.41
Cartilage	48.83	50.48	41.54	42.43
Fats	29.18	23.13	34.15	32.65

The three following analyses of bone in mollities ossium was made by Von Bibra:—

	Tibia of a woman aged 75 years.	Femur of a woman aged 83 years.	Femur of a man aged 61 years.
Phosphate of lime with a little fluoride of calcium	55.01	46.79	53.25
Carbonate of lime	4.94	6.37	7.49
Phosphate of magnesia	2.01	1.20	1.22
Salts	0.31	1.37	1.35
Cartilage	29.17	30.99	32.54
Fat	8.56	13.28	4.15

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Marchand found the bones of the child, whose case has been noticed under the head of the changes of the urine in mollities ossium, composed in the following manner:—

	Vertebra.	Radius.	Femur.	Sternum.
Phosphate of lime . .	12.56	15.11	14.78	21.35
Phosphate of magnesia .	0.92	0.78	0.80	0.72
Carbonate of lime . .	3.20	3.15	3.00	3.70
Sulphate of lime, Sulphate of soda . .	0.98	1.00	1.02	1.68
Fluoride of calcium, Chloride of sodium, Iron and loss .	1.00	1.20	1.00	2.01
Cartilage	75.22	71.26	72.00	61.20
Fat	6.12	7.50	7.20	9.34

In a paper published in the twenty-first volume of the *Medico-Chirurgical Transactions*, Dr. Reese demonstrated by analysis that the different bones of the adult human skeleton in health contained animal and earthy matter in different proportions. Subsequently, Dr. Reese had an opportunity of examining some bones affected with mollities, and the following is the result of careful analyses of three specimens from the same adult subject; they are compared with those obtained from healthy bones:—

	Mollities.		Health.	
	Earths.	Animal matter.	Earths.	Animal matter.
Fibula	32.50	67.50	60.02	39.98
Ribs	30.00	70.00	57.49	42.51
Vertebra	26.13	73.87	57.42	42.58

Dr. Reese observes: "On examining this table it will be observed that in the diseased, as well as the healthy bone, the fibula contains more earthy matter than either the ribs or vertebra; and the ribs more than the vertebra; thus we have the same order preserved in health."

It may be noticed that the vertebra and ribs in health approach very nearly in their proportions of animal and earthy matter; while in mollities a considerable difference exists between them in this respect. This indicates that though the bones are all acted upon by the absorbents in mollities, yet that the absorption does not go on equally in the bones, some being acted on more than others. There is, however, an approach to an equality of action; for, notwithstanding that the diseased bones have lost about half their earthy matter, yet they keep the same order as regards proportional constitution which we observe in health, viz., the fibula

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containing more earthy matter than the ribs, and the ribs more than the vertebra.

Having ascertained, by previous experiment, that the earthy matter obtained from the long bones of the extremities contains, as nearly as possible, 86 per cent. of phosphate of lime in health, and that the earthy matter from the trunk bones contained, on an average, 83.03[1] per cent., I determined on mixing together the earths obtained from the fibula, ribs, and vertebra affected with mollities, and subjecting them to analysis. This bone-earth, on examination, proved to contain only 78 per cent. of phosphate of lime. There is evidence here that the absorption of earthy matter by disease is accompanied by a decrease in the proportion of phosphate of lime to carbonate. This would seem to show that the absorbents carry away earthy matter containing a very large percentage of phosphate of lime, for were it otherwise, we should never find bone earth containing so small a percentage as 78 of that earth; the smallest in health being 81.2 of phosphate, to 18.8 of carbonate of lime. That the carbonate is absorbed together with the phosphate of lime in certain though small proportion in these processes, is proved by the fact that bones, even those most changed by the absorption of their earthy matter, are not very greatly removed from healthy bone-earth in the general average proportion of phosphates and carbonate of lime. (*Guy's Hospital Reports*, No. 8, April, 1839; No. 9, *Medico-Chirurgical Review*, July 1st, 1839, pp. 246—247, Am. ed.)

The carbonate of lime in the bones analyzed by Dr. G. O. Reese may have been derived from the burning of some organic acid, as the lactic, during the preparation of the bone-earth for analysis, and without the clear demonstration of the existence of the carbonate of lime as such in the bone previous to incineration, we cannot lay much stress upon its apparent or relative increase when compared with the phosphate of lime.

Solly[2] has given the following analysis of the medullary membrane and osseous substance of an individual affected with osteomalacia. The analysis of the affected bone was made by Dr. Tuson.

	Medullary matter.	Osseous matter.
Animal matter	24.78	18.75
Calcareous phosphates	1.83	29.17
Water	73.39	52.08

[1] This average was drawn from results obtained from seven specimens; the extremes were 81.2 and 85.0.

[2] Medico-Chirurgical Transactions, vol. xxvii. p. 435.

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The chemical examination of a case (detailed by Dr. Ramsbotham, in the reports of the Pathological Society[1]) by Dr. Garrod, yielded—

Fatty matter	20.35
Gelatin yielding matter	58.37
Carbonate and phosphate of lime and phosphate of magnesia	21.28

M. Barruel, Jr., found 18 parts of earthy salts, and 82 of organic matter, in 100 parts of bone affected with osteomalacia. The bones of the forearm, which were less softened, afforded 29 of salts, and 71 of organized matter, per cent.

Dr. Buisson, in a thesis published in 1851, gives the following analysis of the inferior extremity of the femur of a female suffering from osteomalacia. She was thirty-eight years of age, and her bones had been fractured more than eighty times.

Cartilage	54.37
Phosphates	39.16
Carbonates	6.47

These analyses, says the author, prove that the same results are obtained, whether the bones be softer or more fragile than in health. In all cases there is a considerable decrease of the organic matter. (Simon's *Animal Chemistry*, p. 601. Becquerel and Rodier, *Pathological Chemistry*, p. 507. Rokitansky's *Pathological Anatomy*, vol. iii. p. 144.)

On the other hand, as the basis of comparison, we have given the composition of healthy bones.

Von Bibra has made the most complete analyses of human bone, and the results of his elaborate labors are especially valuable, as serving the purpose of comparison with diseased bones, as he has carefully separated and determined the proportion of fat; whilst the analyses of Berzelius, Thomson, Marchand, Valentin, and Lehmann, do not furnish the proportions of this important constituent of healthy bones. The determination of the proportion of fat in the healthy bone, assumes a position of transcendent importance as the starting point for the determination of the amount and character of the alteration and degeneration of bone in various diseased states, and especially in those diseases of the osseous system which, like mollities, is associated with *fatty degeneration*. The results of the analyses of Von Bibra will be found in the following table, together with those of several other distinguished chemists.

[1] Reports, &c., 1847–48.

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TABLE.—*Chemical Composition of Diseased Bones in Rachitis, Caries, Necrosis, Osteoposis, Sclerosis, Exostosis, Osteoid Tumor, Arthritis, and Callus. By Lehmann, Ragsby, Von Bibra, Pelouze, Valentin, Lassaigne, Marchand, and Simon.*

Author of Analysis.	Disease.	Bones.	Phosphate of lime and fluoride of calcium.	Carbonate of lime.	Phosphate of magnesia.	Salts insoluble in water.	Cartilage.	Fat.	Organic matter.
Lehmann,	Rachitis	Tibia	32 04	4.01	0.98	0.75	54.84	5.84	
"	"	"	26.94	4.88	0 81	1.08	60.14	6.22	
"	"	"	28.13	3.75	0.57	1.01	58.77	6.94	
Ragsby,	" child	Scapula & humerus	15.60	2.66	2.66	0.62	81.12	6 94	
Von Bibra,	" "	Ulna	48.83	7.42	1.23	1.82	35.61	6.09	
Pelouze & Fleming,	" "	Dorsal vertebra	13.60	1.13	0.52	1.82	79.75	6.09	
"	" "	"	13 25	5.95	0.82	1.82	74.64	5.26	
"	" "	Ribs	33 80	4.60	0.82	1.82	49.77	5.26	
"	" "	Cranium	26.92	5.40	0.98	0.85	65.85	11.63	
"	" "	Radius	28.11	6.35	1.07	1.05	63.42	11.63	
"	" "	Femur	23.50	5.07	0.97	0.69	69.77	11.63	
Marchand,	" "	Patella	23 23	5.03	0.94	0.64	70 60	11 63	
"	" "	Vertebræ	12.56	3.20	0.92	1.00	73.22	6 12	
"	" "	Radius	15.11	3.15	0.78	1.20	71.26	7.50	
"	" "	Femur	14.78	3 00	0.80	1.00	72.20	7.20	
Valentin,	Caries, man	Tibia	34 38	6.63	1.18	1.91	..	7.20	55.68
"	" "	Vertebræ	33.91	7.60	0.38	3.27	..	7.29	54.83
"	" girl	Femur	39.39	4.62	0.52	1.17	..	..	54.39
"	" "	Tibia	45.45	5.68	1.18	2.06	..	..	45.62
Von Bibra,	" man	Metacarpi	49 77	7.24	1.11	0.30	37.97	3 61	
"	" "	Metacarpal bones	31.36	4.07	0.83	0.30	59.36	4.08	
"	" "	" "	49.36	8.08	0.98	0.40	37.47	3.71	
"	" "		51.53	5.44	3 43	0.91	35.69	3.00	
"	" "	Femur	54.98	5 97	3.70	0.89	31.44	3.02	
"	" woman	"	45.14	5.03	2.40	0.82	42.34	4 27	
"	" man	Patella	39.22	6.87	0.50	2.10	29 23	22.09	
"	" girl	Tarsus	45 77	3.77	1.45	1.10	38 62	9.29	
"	" woman	Vertebræ	44.05	3.45	1.02	1.70	41.42	8.36	
"	" man	Tibia	47.79	6.44	1.30	2.00	28.57	13.60	
"	Necrosis	Phalanges	72.63	4.03	1.93	0.61	19.58	1 22	
"	" "	Bone	60.77	4.03	1.93	..	..	1.36	38.87
"	" "	Fracture	67.33	4.03	1.93	..	..	1.09	31.58
Ragsby,	Osteoposis	Cranium	55.80	5.59	1.93	..	..	..	38.61
"	Sclerosis, man	"	54.10	10.45	1.00	1.04	33 41		
"	"	"	48.20	7.45	..	0.25	44.10		
"	"	"	50.29	7.20	..	0.25	42.51		
"	"	"	55.52	5 95	..	0.26	38 27		
"	"	Femur	53.21	8.30	..	..	38 49		
"	" syphilitic	"	57.20	6.50	..	..	36 30		
Lassaigne,	Exostosis	Thickened bone	36.3	6.5	..	14.2	36 30	..	43.0
"	"	Exostosis	30 0	14.0	..	10.0	36 30	..	46.0
Simon,	Osteoid tumor	Knee-bone	38.85	2.70	0.58	0.78	58.91	1.16	
"	" "	"	8.00	0 62	0.21	0.39	87.04	3.61	
"	" "	"	9 20	0.64	0.21	0 72	86.20	3.21	
Marchand,	Arthritis, tophaceous deposit	Femur	42.12	8.24	1.01	2.31	86 20	..	46.32
"	" "	Radius and ulna	43 18	8.50	0.99	1.37	86 20	..	45.94
Lehmann,	Arthritis, chronic gout	"	35.16	8.41	1.31	2.93	38.14	12.11	
"	" "	"	35.83	9 82	1.05	2.03	38 20	13 37	
"	" "	"	37.02	8.99	1.13	1.82	40 03	9.15	
Lassaigne	Callosities	"	33 3	5.7	1.13	11.3	40.03	..	50.0
"	"	"	32.5	6.2	1.13	12 8	40.03	..	48.5

In the preceding table it will be seen that, in rickets, according to the analyses of MM. Pelouze and Fremy, it appears that the decrease of calcareous matters was even greater than in individuals suffering from mollities ossium; and in the analysis by Marchand,

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the calcareous salts, and especially the phosphate of lime, are greatly diminished, and the proportion between the organic and inorganic matters is precisely the inverse of what it is in health. The analysis of bones affected with rachitis yields, therefore, results similar to those announced for mollities ossium, viz., decrease of phosphate of lime, and increase of the cartilaginous and fatty matters. It will be seen, however, that the fatty matters are increased much more uniformly, and to a far greater extent than in mollities ossium.

In caries there is a marked decrease of the proportion of phosphate of lime; in some cases a slight increase of the carbonate of lime; no appreciable change in the proportion of the phosphate of magnesia and soluble salts; normal proportion of cartilage, and a frequent and decided increase of adipose matter.

The few analyses in necrosis indicate a slight diminution of the cartilaginous substance, an increase of calcareous salts, and the normal proportion of adipose matter.

In the tophaceous deposits of chronic arthritis there is decrease of the phosphate of lime, increase of the carbonate of lime, and great increase of the adipose matter.

Whilst, therefore, this comparison establishes analogous changes in the bones of certain diseases, as caries, necrosis, and arthritis, at the same time we have a demonstration that mollities ossium is especially characterized by the degeneration of the osseous structure into fatty matter. We cannot agree with those pathologists who see nothing in this disease but a fatty degeneration of bone. In those diseases, as caries and arthritis, in which we have a similar change, but to a less degree, we have inflammatory action; and the true and most important question with reference to mollities ossium is the determination of the causes which led to such an alteration of the bones as led, not merely to the absorption of the earthy salts, but also to the effusion of inflammatory products in the bony structure, and their final conversion into fatty matter, as in those diseases which are, in their inception, truly inflammatory.

The view that the earthy phosphates, in mollities ossium, were removed by some acid generated in the living system, was suggested at an early day in the history of the disease; and, in fact, this idea appears to have been suggested by the effects of acids upon healthy bones in rendering them flexible like cartilage.

Dominic Gagliardi, who, discoursing upon the observation of Gabrielli upon mollities ossium, in 1689, supposed that the earthy

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matter, or bony *gypsum*, as he called it, is softened in consequence of its being alkaline, by the acids which are thrown into the vessels of the bones; and that from hence it is that persons subject to rheumatic and arthritic pains, but peculiarly to pains from the "lues venerea," are also subject to have their bones become soft. This statement led to the experiments of softening the bones by means of acid liquors.

Morgagni adopted the same opinion, and conjectures that a *humor* is carried into the bones, which is capable of softening them, and refers to the experiments of Ruysch, who showed that acid liquids would remove the earthy particles, and render the bones so soft and elastic as to be bent into any shape.

Ruysch, in recording his experiments, makes the following application in the form of a query: "Does it from hence appear in what manner that memorable disease was brought about wherein a virgin, in France, being affected, had all her bones softened down like paste?"

More recently Marchand has propounded a chemical theory of mollities ossium and rickets, which is a further elucidation of the old idea of the action of an acid humor in the blood. This theory of Marchand we have thrown into three propositions as follows:—

1. The diseases which exert the greatest influence over the condition of the bones, altering them from their normal state, are scrofulous affections, to which rickets and mollities ossium may be considered as belonging.

In these two diseases, the earthy matter of the bone becomes diminished, and the bone falls into a state such as if it had been macerated in muriatic acid; supple; flexible, and ill-adapted to serve as a support to the other organs of the body. The cartilage itself undergoes an essential alteration, and is incapable of being converted by boiling into gelatine.

2. Concurrently with these changes, phosphate of lime is eliminated in large quantities with the urine. This salt, otherwise little soluble, and discharged generally in small quantity by the kidneys, is, according to Berzelius, readily soluble in lactic acid; anything, therefore, which causes a superabundance of this acid in the system, is capable of depriving the organism of a large share of the earthy matter of the bones.

Sugar of milk, grape sugar, starch, and gum are readily converted into lactic acid, but they are so in the stomach only when

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digestion is ill performed, in which case lactic acid may be an abundant product in the system.

3. Rickets and mollities ossium, therefore, are not essentially diseases of the bones, but seem to be the result of imperfect digestion or nutrition; to improve which is consequently our first indication.

None of the substances readily converted into lactic acid should be taken, as sugar, starch, gum, etc., nor even milk (rickets are often the consequence of children having been too long suckled), but animal food and such other as is freely digestible, should be chosen, in aid of which we ought to employ such medicines as may restore the general tone of the system.

This chemical theory of Marchand is sustained by the discovery of increased quantities of lactic acid and lactates in the urine of rickets and mollities ossium; and by the actual discovery of lactic acid in the diseased bones of the latter disease.

C. Schmidt proved clearly that free lactic acid was present in the fluid of the cylindrical bones in this disease; and Lehmann states that the fluid occurring in these bones exhibits *very often*, although not invariably, an acid reaction. Weber, who alone appears to have investigated the composition of the phosphate of lime contained in these bones, found in addition to carbonate of lime $\frac{2}{3}$ basic phosphate of lime, and believes that phosphate of normal bone ($3CaO,PO_5$) is converted by means of the free acid into this less basic salt.

The singular and painful disease of the jaw-bones, produced by the fumes of phosphorus and phosphoric acid,[1] renders it probable that in mollities ossium, most of the pain and irritation of the bones may be caused by the liberation of phosphoric acid in the phosphate of lime which has been subjected to the action of the *free* lactic acid.

[1] For an interesting account of the Diseases of Workmen engaged in making Lucifer Matches, see American Journal of the Medical Sciences, Oct. 1846, N. S. vol. xii. p. 525.

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A CANULA NEEDLE

FOR

APPLYING LIGATURES AND STITCHES.

BY

PAUL F. EVE, M. D.,

OF NASHVILLE, TENN.

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A CANULA NEEDLE FOR APPLYING LIGATURES AND STITCHES.

I DESIRE to call the attention of the Surgical Section for a few moments to a needle adapted specially for metallic wire, which has now been tested for years, and found greatly to facilitate the insertion of stitches and ligatures. It is a canula-needle of the simplest construction, slightly curved, secured in a fixed handle so as to be directed at will, with a calibre to carry thread of silk, silver, iron, or lead. The canula opens on the inferior surface, and not on the upper, as is most commonly the case, is about an inch and a quarter in length, and two sizes will answer every purpose. The improvements proposed to it by M. Luer, of Paris, the late George Tiemann, of New York City, and Dr. Bryant, now of Lexington, Ky., have, in my experience, proved to be unnecessary complications.

This needle may, or may not, be armed with the material for the suture or ligature when thrust through the soft parts or under an artery, as the thread or wire, or a pin for the twisted suture, can as easily and as well be then placed into the distal end of the canula, and thus equally deposited in its tract by withdrawing the instrument.

No special claim is advanced for originality, as this canula-needle is a mere modification of similar instruments heretofore suggested for ligatures; but its simplicity, small cost, and extensive application in surgery, for it has been successfully tried even in vesico-vaginal fistula, would seem to recommend its general use in practice.

CASE.—In 1860, I utterly failed to benefit a patient laboring under that most distressing affection in the female, *vesico-vaginal fistula*, in which a clamp suture was tested. There is little doubt now but that this case could have been relieved by the recent improvements in gynæcology. Still I have never been satisfied

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with the practice pursued in introducing the sutures for closing the fistulous opening, after its edges are prepared for reunion. The short, curved needle, insecurely held and imperfectly directed by long forceps, armed with a long double silk thread, having attached to it a long silver wire, also doubled, the whole of which is dragged through the entire tract made in the soft parts, with the traction on the cord at right angle to its proper course, is surely difficult, cumbrous, painful, tedious, unscientific, and now unnecessary. Frequently half an hour is consumed in this part of the operation, while the patient is in a constrained and exceedingly unpleasant position. By the canula-needle the ligatures may be applied at any desired point in a few minutes. In witnessing an operation for this sloughing of the vesico-vaginal septum, to which I was kindly invited in the Sisters' Hospital in St. Louis, last fall, and, impressed with the difficulty and delay in applying the sutures, the hollow needle was proposed, and fortunately an opportunity soon occurred for proving it.

On the 15th of November last, I was called to a case of vesico-vaginal fistula in a young lady, who, during her first delivery, a week or two previously, had had the bladder neglected for many hours, which resulted in a transverse fissure of about an inch and a half by three-quarters of an inch, and situated about an inch and a half from the orifice of the urethra. The 16th of January, 1869, assisted by Dr. Shumard, Professor of Obstetrics, etc., in the Missouri Medical College, and Drs. Poindexter, Prewitt, Moore, and Maughs, the patient was placed in the position now recommended by Dr. Sims, and accepted by the profession; the anterior lip of the fistula was freely excised by a knife and the posterior one with scissors, then with the canula-needle, such as I have been using for years, carrying a very fine silver wire, about nine sutures were

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introduced in some ten minutes. Tiemann's improvement, as well as Dr. Bryant's, formerly of St. Louis, now of Lexington, Ky., each consisting of a longer canula, with forceps to hold and assist in pushing forward the wire, were both tried, but found to bend in thrusting it through the parts, and, moreover, permitted the metallic ligature to kink. The simple canula, such as is represented by the accompanying woodcut, was admitted by all present to be the best instrument, and gave entire satisfaction in planting the ligatures. I prefer, too, the ordinary knot, for one can see the line of union and regulate the pressure in tightening the stitch. The suture-adjuster obscures this, nor can we tell how many turns to give the forceps in twisting the wire. After one knot the adjuster may be used.

On the tenth day, after the usual treatment of such cases, which, in this instance was carried out faithfully, the sutures were all removed, except two, and these on the twelfth, when union of the most satisfactory character was found to have taken place.

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REPORT

ON THE

BEST METHODS OF TREATMENT FOR DIFFERENT FORMS OF CLEFT PALATE.

BY

WM. R. WHITEHEAD, M.D.
OF NEW YORK.

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REPORT ON THE BEST METHODS OF TREATMENT FOR DIFFERENT FORMS OF CLEFT PALATE.

ONE of the earliest descriptions of an obturator for the occlusion of acquired defects of the palatine vault is due to Ambroise Paré.

The first attempt to close, by a surgical operation, fissure of the soft palate was made in 1816 by Graefe of Berlin, but the first successful operation for this infirmity was accomplished by Roux in 1819. The operation of staphylorraphy soon acquired a prominent position in the eyes of surgeons, and found much favor with some who skilfully imitated Roux's ingenious example.

The names of a number of American surgeons are favorably associated with the early history of this operation. Distinguished among them are those of J. Mason Warren, of Mass., Pancoast, of Penn., and Mettauer, of Virginia. The successful operations for cleft of the soft palate stimulated Roux, Kreimer, Warren, and others to essay the closure of fissures of the hard palate. A very successful case by Warren, attested the triumph of American surgery over the efforts of Roux and others. Furguson, by a proper division of the levator palati muscle, improved the operation of staphylorraphy, and made its success more certain. Pollock, in detaching the mucous membrane from the gums and palatine vault by judiciously conducted incisions, has in a number of cases, as has also Baizeau, closed apertures of the hard palate. This, however, J. Mason Warren had already done. More recently, Langenbeck, by detaching the muco-periosteal coverings of the gums and roof of the mouth, has closed extensive clefts of the hard palate, and, in a certain proportion of cases, obtained a development of new bone, which occluded the palatine openings.

Langenbeck, Simon, Billroth, Beck, and other German surgeons have quite fully established this operation; especially the first two, who have repeatedly closed, at one operation, wide clefts involving both the hard and the soft palate. This I have successfully accomplished; but I regret that my opportunities have been so limited.

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as not to permit me to speak with the confidence that I would wish; nevertheless, I can satisfactorily answer the essential questions of interest pertaining to the subject of this report. I feel confident that more extended opportunities will quite confirm the opinions which I now entertain regarding the treatment of cleft palate generally. There are marked differences in the size, form, and general appearance of cleft palates. They are naturally divided into those which are congenital and those which are the result of disease. Congenital cleft of the palate may extend entirely through both the hard and the soft palate, and be complicated with complete fissure of the alveolar process and with harelip. Usually, the cleft is less extensive: generally, it involves only the palatine bones and the soft palate. The fissure may be median or lateral —most frequently on the left side. Sometimes there is a double fissure of the vault, with separation of the velum. It is rare to see congenital cleft of the hard palate with the soft palate intact. Occasionally the fissure is very much on one side, the opposite side of the vault being normal, and its surface continuous with the vomer, which, with the turbinated bones, may be plainly seen through the fissure. There are many peculiarities in this infirmity. Sometimes there is an ugly projection of the intermaxillary bones, complicated with double harelip. A depression of the edges of the cleft; an incomplete development of the velum; a flattened form of the palatine vault, and the height of the alveolar processes, are conditions which require an attentive consideration for the proper treatment of congenital cleft of the palate. Not less important is the width of the cleft and complications, such as harelip, which may be accompanied with an exaggerated size of the nostrils. These defects sensibly affect the speech after the successful occlusion of a cleft palate by surgical means or by an obturator. The mental aptitude of the patient, in his efforts at distinct articulation, will considerably influence the result of the treatment. Apertures in the palate caused by disease or by wounds, are necessarily less uniform in appearance than congenital deficiencies of this part. The acquired defects are rarely attended with a cleft of the velum. After this brief preliminary sketch of the subject, I shall describe those selective means, which, in my judgment, are the best methods of treatment for cleft palate. It is not exclusively by one mode of treatment that the best results are obtained; but it is worthy of observation, that within a few years, the surgical treatment of cleft palate has acquired an importance, which deservedly places it in the first rank. The operation for a cleft involving only the soft

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palate, and known as staphylorraphy, need not occupy our attention, except as regards its influence on the speech. The closure of defects of the hard palate, attended, or not, with separation of the velum, by the method which, in a large number of cases, is the most desirable, and known by the name of muco-periosteal uranoplasty, is due to the fertile genius of Langenbeck. For a correct understanding of this method, it is necessary to recall to mind the distribution of the arteries of the roof of the mouth (see Fig. 1). At the junction of the horizontal plates of the maxilla and palate-bones with the alveolar process, there is a groove, in which courses the superior palatine artery. This artery, which is of considerable size, emerges from the orifice of the posterior palatine canal, and after running along in the groove ascends through the anterior palatine canal, anastomosing with its congener and the naso-palatine. Some small branches, which emerge from the accessory palatine canals, contribute to nourish the velum. The proper disposition of the incisions, and the protection of the arteries from injury, insure the nutrition of the muco-periosteal coverings, which form the flaps in Langenbeck's operation. Having simplified some of the instruments and used an efficient gag (see Fig. 2), in this operation, I shall describe it as I have successfully performed it, and not as described by Langenbeck and others. The original conception of a gag somewhat similar to this one is claimed for Dr. Mussey, of Cincinnati, by Mr. Stohlmann, of the firm of Tiemann & Co., New York, makers of surgical instruments; Dr. Louis Elsberg, of New York, first called my attention to this instrument, and proposed for it a tongue-depressor. Mr. Stohlmann has recently made in this gag some slight, but useful, modifications. Mr. T. Smith, of London, has also used a gag with a tongue-depressor, in staphylorraphy on children.

Description of the Operation.—The patient being etherized and placed in a proper position, with the head slightly elevated, the gag is adjusted to the mouth, or, in lieu of this instrument, a cork is placed between the teeth, with a string attached to it. If there be insufficient light, artificial illumination may be used. The operation is commenced by dividing the palato-pharyngeus and the palato-glossus, on each side (see Fig. 3—showing posterior view of the palate), either with a sickle-shaped knife (see Fig. 4, E), or with scissors slightly curved on the surface seizing the muscles with forceps. The levator palati is next thoroughly cut (see Fig. 3), either with a knife like that used by Furguson, or with one like Langenbeck's (see Fig. 4, D). The point of this knife should be

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passed around and behind the hamular process, from without inward, and over the lower and inner surface of the internal pterygoid plate, and along the posterior border of the palate bone, to the cleft. In this manner the mucous membrane is cut, which confines each half of the velum, even after the section of the levator palati, and the flaps fall together when other stages of the operation are completed. An incision is next made along the edges of the cleft, and afterwards the side cuts (see Fig. 5), which extend slightly beyond the last molars and to about the eye-teeth. These cuts are made through the periosteum to the bone. The periosteum is then detached, taking care to respect the parts around the orifices of the posterior and anterior palatine canals (see Fig. 1), so as to avoid impairing or destroying the vitality of the flaps by injury to the superior palatine artery. This artery is contained in the flaps, and is lifted with them from the bone in detaching the periosteum, which is best done with an instrument (see Fig. 4, A) like that used by Dr. Sayre in operations about the hip-joint. The paring of the edges of the fissure is done by means of knives bent at a proper angle (see Fig. 4, G), holding the flaps with Sims' delicate tenaculum; or the paring may be done with properly curved scissors. The passage of the sutures through those parts of the flaps in the narrow space between the alveolar processes, and corresponding to the vault, is most conveniently done by means of a needle like that represented at Fig. 4, C, and Fig. 5. For the passage of the sutures through those parts of the flaps which correspond to the soft palate, Sims' or Emmet's needle-holder, and properly curved needles are required. Roux's needle-holder appears to be quite as good as any. The canulated needle for silver wire I have used. This needle is complicated and easily disarranged. Looped threads should be used to draw the silver wire through. Should one of the threads break, or it be found more convenient to pass the needle from before backward, through both of the flaps of the soft palate, the following simple device (see Fig. 6) which Dr. Emmet uses in similar instances in operations on the vagina, will be found exceedingly serviceable. Each wire is seized with Sims' wire-twister and adjusted with the hook of his tenaculum. Then the forked instrument represented in Fig. 5 is applied and the wire twisted until the twist in it reaches the fork of the instrument. The wire is then turned down and cut, using the tenaculum to assist in bending it. The side cuts are stuffed with bits of lint or cotton saturated with glycerine, to keep them from closing too soon; these bits by their pressure on the flaps

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extend the line of union. The sutures should not be removed before the 14th day. Rest, liquid food, and entire abstention from speech should be enjoined. Spray containing carbolic acid should be used to cleanse the nose, throat, and mouth, taking care not to project the spray on the line of union. The side cuts are made with a knife like the one represented at Fig. 4, F. If during the operation considerable hemorrhage should occur, it may be quite readily checked with ice-water spray.

In detaching the periosteum there is usually very little bleeding. There is often more in cutting the levator-palati muscle. Formerly, during the operation known as *mucous-uranoplasty*, there was often troublesome hemorrhage, but this rarely occurs when the periosteum is detached. In acquired defects of the palatine vault, from disease or other causes, and when the soft palate is intact and there is a bridge of bone remaining behind the hole in the vault, to which bony bridge the soft palate is firmly attached, it is obviously unnecessary to cut the muscles of the velum. Otherwise they should be cut, or the operation will fail, because they are constantly, by their contractions, exerting a strain on the sutures. The success of this operation has been fully established in Germany. Only in a certain proportion of cases has there been a reproduction of bone from the periosteum. The result obtained by the operation, in properly selected cases, is superior to that of any other mode of treatment. I do not think, like Langenbeck, that the operation is suited to nearly every case. There are cases where it is impossible of application—that is, in those where there is not amply sufficient tissue to form the flaps. In such cases a properly adjusted obturator is better than any operation. If there is quite an incomplete development of the bifid velum and the cleft is very wide, the newly-formed palate will be very tense, and the speech, even if distinct, will generally remain strongly nasal, because the new velum will be too short and its movements too limited to occlude the buccal from the nasal cavities. The advantages of the operation, however, in such cases, would be to procure an improvement in speech and prevent the nasal secretions from flowing downward into the throat and stomach. It is especially in acquired defects of the palatine vault, when there is not too great a destruction of the parts, that this operation is attended with the happiest results, in the immediate restoration of normal speech. The cause of nasal tone in persons not affected with cleft palate is often due to inefficient contraction of the levator and tensor palati muscles, con-

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currently with the contraction of the constrictor pharyngis superior. The contraction of these muscles should make the velum and posterior wall of the pharynx approach in such a manner as to shut off the buccal from the nasal cavity. If the occlusion is incomplete, as in the temporary paralysis of the soft palate, from diphtheria, the voice will partially escape through the nose. To bad habit of speech is rightly attributed nasal tone in a large number of persons with well-formed palatine organs. I have observed, on the contrary, a remarkable distinctness of speech, with greatly-lessened nasal accent, to follow careful and intelligent efforts at articulation, when the newly-formed velum was quite insufficient to occlude the pharyngeal from the nasal cavity. Sometimes, a more permanent impairment of speech may result from an extensive notching of the pillars of the fauces, in a careless excision of the tonsils, than would be occasioned by the cicatricial retraction of the muscles of the palate, after a successful operation of staphylorraphy. Those conditions of the palate having been mentioned, in which an operation for cleft palate is not advisable, it remains to speak of other modes of treatment. At Fig. 7, A, is illustrated the form of metallic obturators used by Ambroise Paré for closing apertures of the hard palate. Such devices dilate the aperture and ulcerate its edges. It is common to see bread or cotton stuffed in the hole which soon enlarges by the constant pressure on its edges. There are different forms of obturators which are more or less useful. Some of them improve the speech. The most ingenious are those with a soft rubber attachment, which is intended to perform the offices of an artificial velum. The accurate adjustment of this kind of obturator requires considerable mechanical skill, which few dentists possess. At Fig. 7, B, is represented the obturator of Dr. Norman W. Kingsley, a skilful dentist of New York. This instrument is composed of several parts; it is attached to the teeth in front, and otherwise properly adjusted to the mouth. It is to be regretted that such contrivances are liable to be disarranged, and that they wear the teeth, besides being very expensive. Each day the obturator should be removed and cleansed. It is, unfortunately, only a make-shift, which ought, whenever it is possible, to be replaced by other means which will give permanent benefit. In young children, forcible compression of the maxillæ with a suitable mechanical device, will sometimes produce a very rapid and sensible lessening of a cleft of the palatine vault, causing, however, deformity of the upper jaw.

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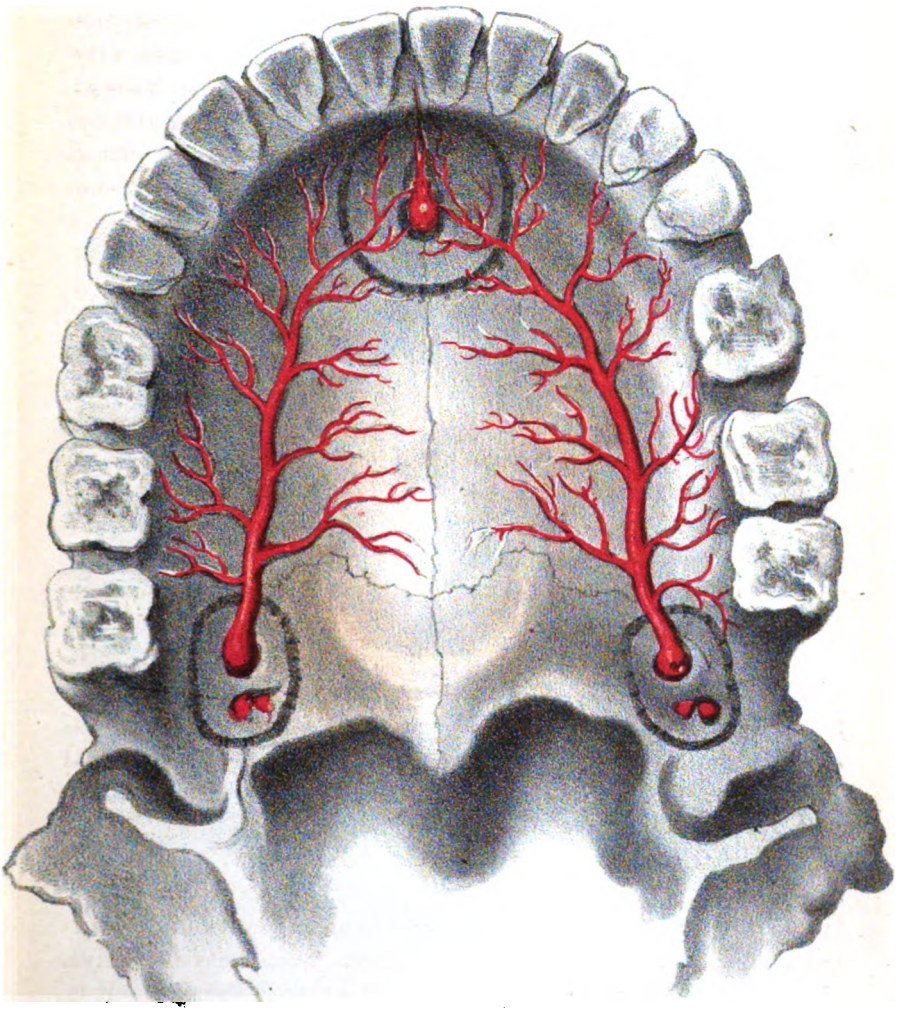
Fig.1.



Much enlarged. Reduced from a rough drawing used for demonstration at a distance, but not enough reduced.

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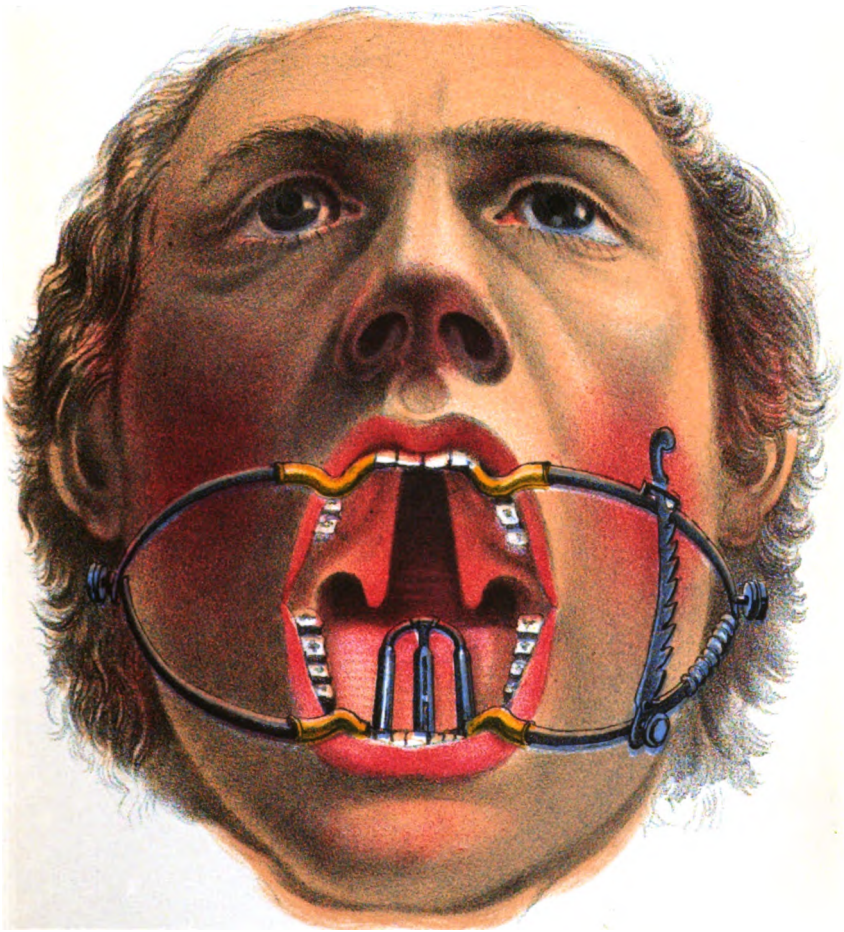
Fig.2.



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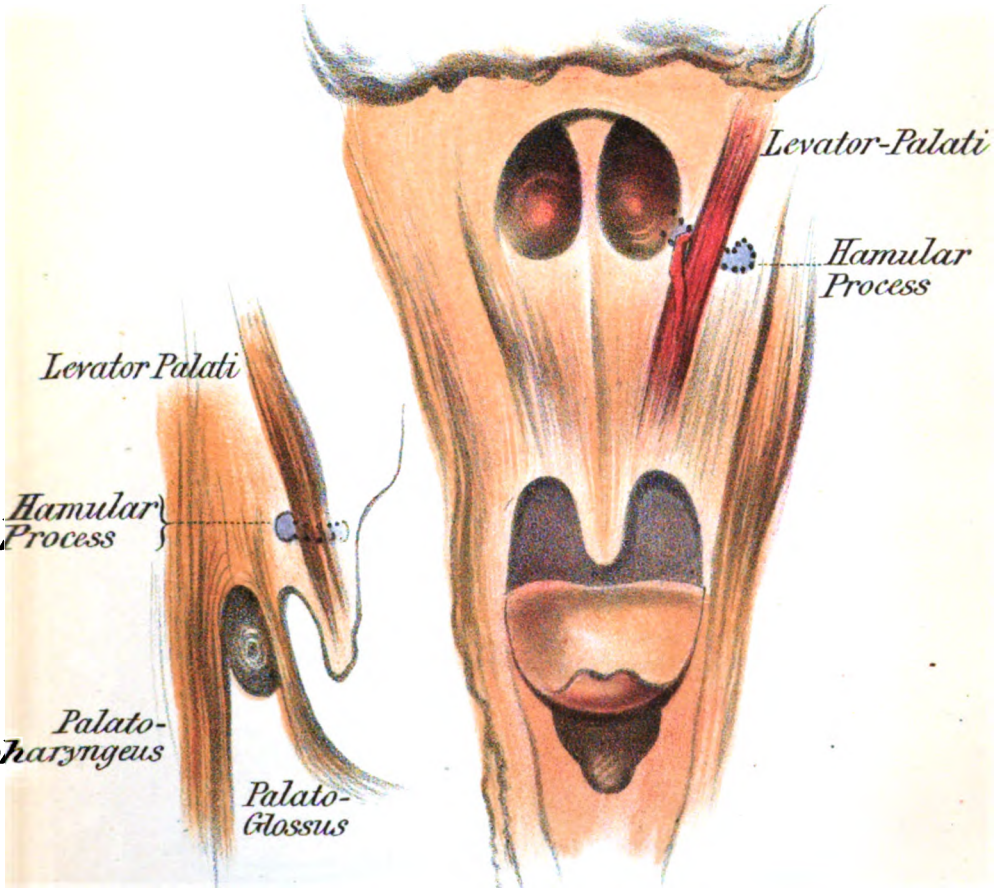
Posterior View of the Palate.



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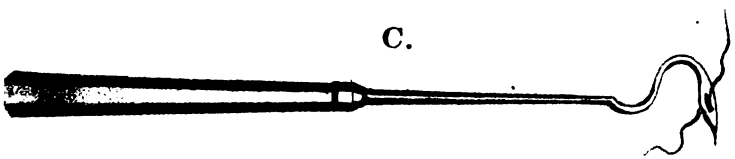
A.

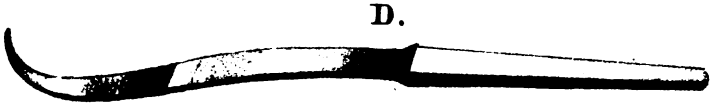
B.

Langenbeck's Periosteal Elevator.

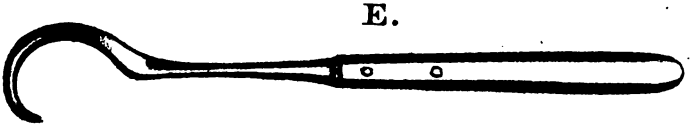
C.



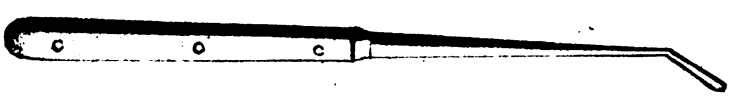
D.



E.



F.



G.

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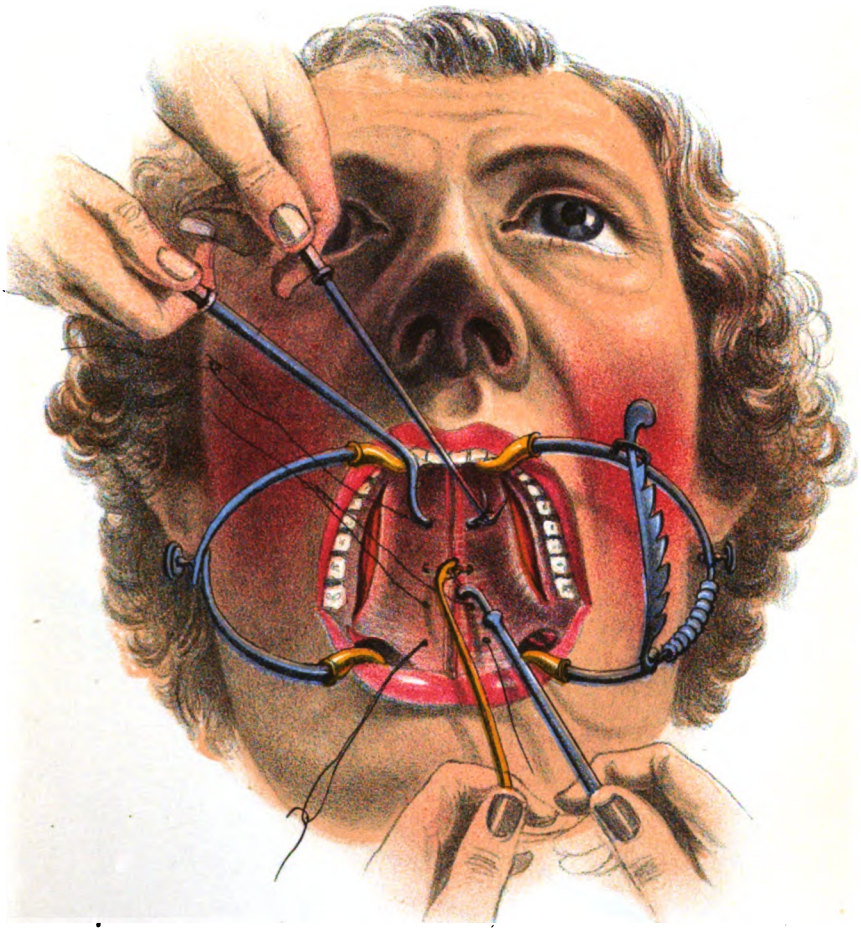
Fig. 5.



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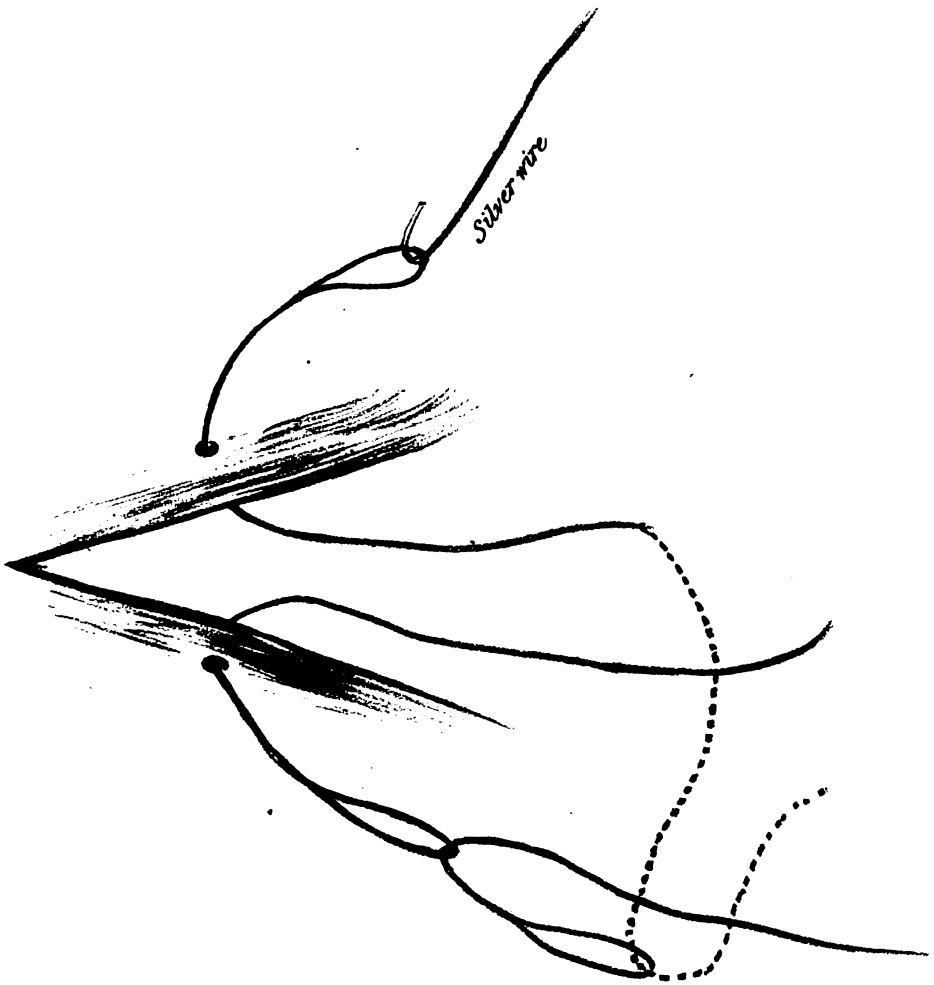

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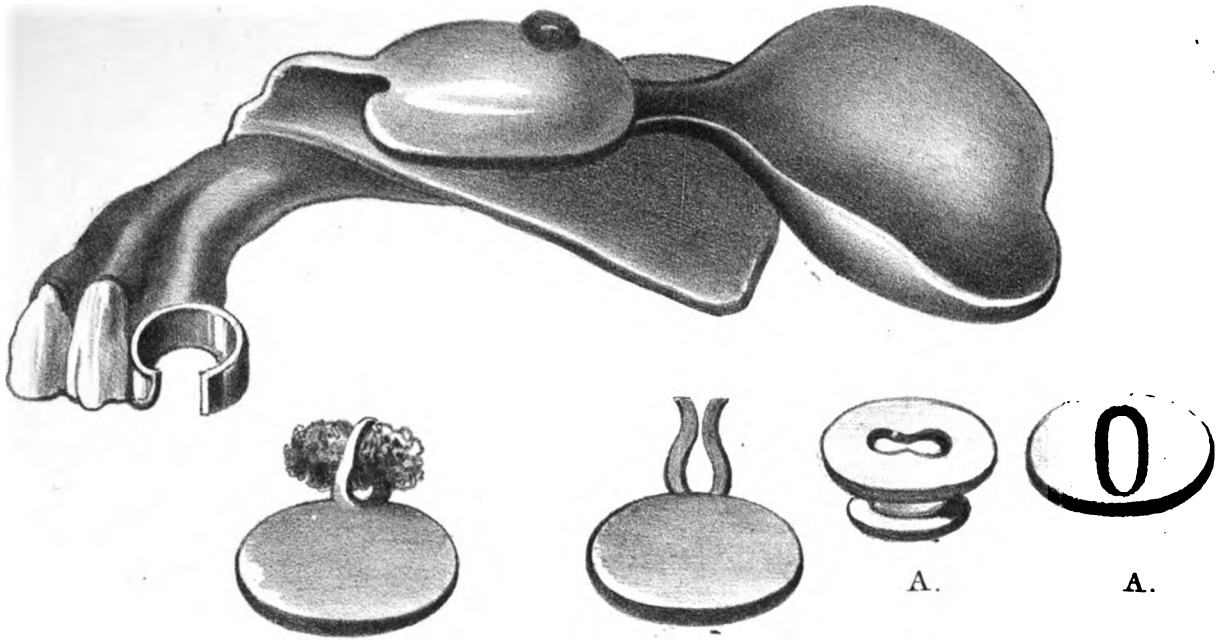
B.



B *is reduced from a rough drawing used for demonstration, but not sufficiently reduced.*

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SUPPLEMENTARY NOTE.

I propose to offer soon some general remarks on the reproduction of bone by the transplantation of the periosteum in connection with the operation for cleft of the hard palate. As these remarks are not yet prepared, I shall simply call attention to the following note:—

NEW YORK, September 17, 1869.

DR. W. R. WHITEHEAD—*My Dear Sir:* In compliance with request is inclosed a statement of the results obtained from an examination of two cases which were submitted by you to the operation of muco-periosteal uranoplasty. In the case of Miss S., ætat. 15, there has evidently been deposit of bone in the periosteal surface of the flaps which now form an admirable substitute for the natural hard palate. The point of a sound (Sims's), introduced through the nostril and pressed with some force against the floor of the nasal cavity, conveys no impression to the finger applied to the corresponding part of the bucal surface. A needle, introduced at various points along the cicatrix which indicates the line of union of the flaps, comes into contact with, and, by exercising considerable force, can be made to penetrate, what has certainly all the physical properties of bone.

In the case of Maria D., ætat. 7, the needle, introduced along the mesial line, gave the same results. The point of the needle appeared to pass about a line through a structure of the density of muco-fibrous membrane, and then come in contact with a more resisting body, which, by the exercise of force, the point of the needle could be made to penetrate so as to be immovably fixed. On withdrawal, it did not bring down with it the whole newly-formed vault, but only a portion immediately surrounding, say a radius of about two lines, and the impression conveyed to my mind was that the palate was formed by the reproduction of bone.

Respectfully yours,

CHAS. K. BRIDDON, M. D.

Miss S., ætat. 15, was operated upon on the 9th of July, 1869, for a very extensive cleft of the hard and soft palate, and was seen by Dr. Briddon in September, ten weeks after the operation.

This case presents some features which I think are especially worthy of notice. She was afflicted with cleft palate which extended to one-quarter of an inch of the alveolar arch in front, and consulted me at the kind suggestions of Dr. John W. Warner and of Dr. Charles I. Pardee, of this city. The cleft was $1\frac{7}{8}$ inch long; $\frac{1}{8}$ inch wide anteriorly, and $\frac{7}{8}$ inch opposite the centre of the last molars. The cleft of the velum was $1\frac{1}{8}$ inch wide. See Fig. 8.

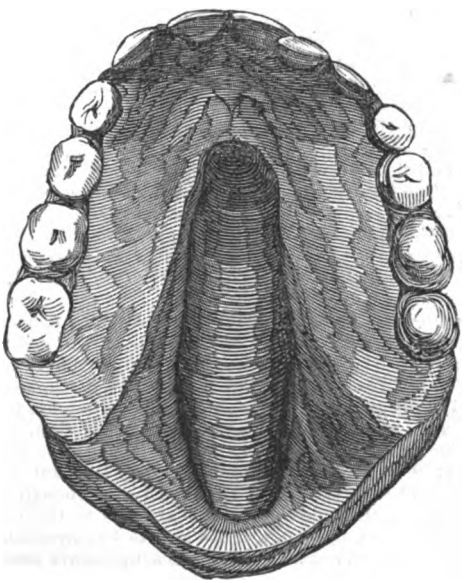

Fig. 8.

From a plaster-cast of the mouth before the operation (natural size).

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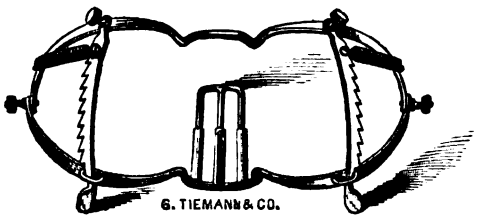
On the 9th of July, 1869, a few days after first seeing her, I closed the whole of the opening very much in the same manner that I have described. The day being stormy and dark, and the position of the patient exceedingly inconvenient, the operation was very long and tedious. The wire gag, such as I had previously used, broke soon after commencing; but the accompanying wood-cut represents one which is modified, and which, I think, is strong enough to resist the action of the



most powerful jaws. On the breaking of the gag, I immediately put a cork between the teeth, with a string attached to it; but Dr. J. C. Nott rendered me valuable assistance, by placing a piece of soft pine wood between the teeth and forcing open the mouth.

The muscles of the palate were *thoroughly cut*. The point of the knife, see Fig. 4, D, was passed around and behind the hamular process, and over the lower part of the internal pterygoid plate, so as to cut loose the mucous membrane which still confined each half of the velum to this part. Incisions were made along the edges of the cleft. Deep cuts along the border of the gum on each side, divided the periosteum. The muco-periosteal covering of the gum was divided and readily detached, with the instrument which I use for that purpose, *except at the anterior and two posterior points of emergence of the nutrient arteries of the flaps*. The flaps then could be readily slid together at the middle line. Their edges were widely pared and retained in apposition without strain with eight or nine silver sutures, which were accurately twisted, turned down, and cut off close. Dr. F. A. Burrall assisted me with iced water spray to control hemorrhage. Dr. S. F. Morris etherized the patient. On the first and second days after the operation it was succeeded by more local reaction than I have before observed. But union was not in the least prevented, except at the uvula, which partially sloughed. The sloughed part was removed with curved scissors, and on the eighth or tenth day the bifurcated edges of the stump of the uvula were pared and secured without trouble by a silver suture. The side cuts were kept open for several days, with lint saturated with glycerine. Spray of water, containing carbolic acid, was used two or three times a day to keep the parts clean. The last suture was removed on the eighteenth day in the presence of Dr. Warner.

Dr. Stephen Rogers, Dr. Nott, and a number of other gentlemen saw her afterward, when the parts were found to be firmly united.

On the 14th of September, 1869, I thoroughly tested the roof of her mouth with the point of a needle along the *middle line* and elsewhere, using considerable force. The impression produced on my mind was that simply fibrous tissue could not offer such resistance as I felt, and that the point of my needle was arrested by bone. There remains a small opening less than the sixteenth of an inch at the extreme anterior part of the place of the former cleft. This opening I have touched with nitrate of silver, which, I think, will effectually close it after a few applications.

Her friends have already observed an improvement in her speech. She expresses much satisfaction at the result of the operation. Fig. 9, lithographed from a photograph of her mouth taken on the 15th of September, 1869, by Mr. John O'Neil, Photographer, No. 949 Broadway, shows the appearance of the newly formed vault and most of the soft palate, which are both well-shaped.

Maria D., ætat. 7, was also seen by Dr. Briddon, September 17th, nine months after the operation. This case has been reported in the *New York Medical Journal*, April, 1869, and has been quite accurately illustrated, with the exception of some unimportant details about the lip and teeth; though I am not aware that any one has observed these defects, which are due to the anatomical draughtsman, and were not noticed by me until too late to be corrected. The needle used in both cases for testing for bone was a stout acupressure needle.

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Case of Miss S.—*Appearance of the mouth after the operation.* (From a photograph.)

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REMARKS

UPON SOME

POINTS REFERRING TO SUCCESS IN THE OPERATION OF VESICO-VAGINAL FISTULA.

BY

M. SCHUPPERT, M. D.,

OF NEW ORLEANS.

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REMARKS UPON SOME POINTS REFERRING TO SUCCESS IN THE OPERATION OF VESICO-VAGINAL FISTULA.

THERE is probably no disease of any import in the whole arena of surgery the successful treatment of which, in point of interest, can be compared to the urinary fistules of women.

Surgery does not point out another instance where a disease, considered for centuries, by the most prominent surgeons, as an opprobrium to the healing art, in the short space of a decennium has become manageable to such a degree that almost a tyro in the profession nowadays can accomplish a cure where the most eminent operators failed before. It is therefore very natural and interesting to inquire after the means to which we are indebted for such an unheard-of success in the treatment of one of the most formidable diseases human flesh is heir to.

I do not fear contradiction when I assert that the success in the operation of vesico-vaginal fistula dates from the introduction of a proper instrument, by which those parts formerly thought to be inaccessible were first brought into a good view and made easy of access to the eye and hand, and that instrument was a *properly constructed speculum*. The invention is claimed by Dr. M. Sims, of New York; but in that invention he has been anticipated by a surgeon whose merits were not appreciated even, I am sorry to say, in his own country.

J. v. Metzlar, of Prague, published in 1846 a treatise under the title *Pathology and Treatment of Urinary and Vesico-Vaginal Fistules, with a Method of Treatment easily executed and completely successful*, in which treatise he says: "To perform the operation successfully, it is of much importance to have a speculum, serving as a dilator of the vagina. Such an instrument consists of a grooved conical blade five and a half inches long, three inches wide at the anterior part, and one-half of an inch wide at the posterior. The end of the speculum is bent to a right angle, and

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protected with wood for the handle. The instrument is best when made of silver and polished, to reflect the light on the parts to be operated upon."

Metzlar placed his patients on their knees and elbows, and made use of clamps, which were held together with gilded needles. He reported six cases successfully treated.

Having such a speculum, then, the *only* requisite for obtaining a favorable result consists in a *proper paring* and *coaptation of the fistulous borders*, which should be held in contact with interrupted sutures for from seven to fourteen days. The material of the sutures, if of silk or metallic wire, is of minor consideration.

I am conscious that, in advocating such a simple treatment, I will meet with much opposition; yet I do not despair, armed with the stubborn facts in my possession, of proving, to the full satisfaction of the profession, the truth of what I now assert, viz., that we may dispense with the silver wire sutures, with the button suture, with the catheter, ay, with all the paraphernalia of the after-treatment, without diminishing the probability of a successful issue!

Let us now examine and compare the opinions of the most conspicuous surgeons, who have done so much to advance the operation in question. Who has not read that pamphlet published in 1858 by Dr. M. Sims, of New York, entitled *Silver Sutures in Surgery*, the introduction of which into surgery he proclaimed "from the housetops" as "the great achievement of the nineteenth century," prophesying that the next eight years would not find an educated physician who would dare to use silk sutures? The success Sims met with in his operations for vesico-vaginal fistula he mainly ascribes to the use of the *silver wire sutures*.

Gustav Simon, Professor of Surgery at present in Heidelberg, has published in Nos. 46 and 47 of the *Teutsche Klinik* (Nov. 14, 1868) a *résumé* of his operations of vesico-vaginal fistula up to the time of the publication of the said article. Of 118 fistules, occurring in 105 patients, he obtained a perfect cure in 92⅔ per cent.; and such a result was obtained with the use of the much decried silk sutures, which Simon even prefers to the use of wire sutures. The only real progress which has been attained in the operation Simon also attributes to the speculum, which he, in ignorance of its first inventor, calls Sims' speculum. Simon, in refreshing the edges, does not exclude the bladder, nor is he particular to avoid the bladder in applying the sutures. Moreover, in large fistules, he

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believes that a great deal of his success rested in a second row of silk sutures, which were entirely thrust through the bladder to protect the first row of sutures, by which the fistulous borders were united, against tension. He removed the sutures from the fourth to the seventh day. In some cases, the sutures remained for several weeks imbedded in the tissues, and he never observed any bad result from them. This may suffice to neutralize the enormous enthusiasm in connection with the "greatest surgical achievement of the nineteenth century." The facts I present here prove conclusively that silk, as a suture, may be used with the same good result as silver wire.

Now, a word about the controversy regarding the different modes of applying the silver sutures in this country. It is known that Dr. Bozeman, of New York, has invented a contrivance, which he calls "the button suture." In an extract from the *N. Y. Med. Journal* for February of this year, Dr. B. gives a view of the relative merits of the interrupted silver wire suture and button suture, which "he thinks warranted by the importance of the subject," and in which he tries to demonstrate the button suture to be superior to the interrupted wire suture. Dr. Emmet, of the New York Woman's Hospital, in an essay on vesico-vaginal fistula, published last year, on the contrary shows by indisputable facts what a success can be obtained by the simple interrupted silver wire suture, preferred by him and Sims. "Sims," he says, "has operated probably several hundred times. I," he remarks, "previous to October, 1867, had about 270 cases under my charge, of which 200 were cured; from 50 to 60 returned home improved, most of which might have been cured; 5 were regarded as incurable. Since October, 1867, to May 1, 1868, 26 cases were admitted, of which 10 cases were cured, and 2 discharged as incurable. Of 75 selected cases the full history is given; 50 of which were cured in one, 13 in two, and 7 in more than two operations." He further says: "As to the best method of securing the edges of the fistula, I have an unqualified preference for the simple interrupted suture, twisted."

To accomplish the cure of a case of vesico-vaginal fistula, the *after-treatment* has always been considered to be the most important part of it. The patient is kept in bed for many days in a very wearisome position; her bowels are confined with opium, to exclude all intestinal movements; a catheter is permanently applied by the urethra, to keep the bladder empty, and to hinder the urine from coming in contact with the newly united edges of the fistule;

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and, finally, a certain diet is strenuously recommended. But of all the inimical agencies thought to stand in the way of a happy result, that most feared is the urine. To such an extent had the terror of that obnoxious fluid even affected me, that I have thought it necessary to wash out the bladder during the first forty-eight hours after the sutures were applied, every half an hour. Was there no justification for this action? Had not even a great surgeon recommended, besides the use of the catheter by the urethra, the puncture of the bladder above the pubes, in order to keep the bladder entirely empty? Did not every surgeon of any experience in the operation speak of the permanent application of the catheter as the most important part of the after-treatment? Did not Sims, the great apostle of the operation in this country, attribute a great deal of his success to his "happy invention" of a properly-shaped catheter? Dr. Emmet, in the latest work on vesico-vaginal fistula, still says: "To Sims' catheter we are greatly indebted for the success in this operation, as well as for much additional comfort to the patient. It should not touch the fundus of the bladder, and be nicely balanced in the urethra, and lie close up behind the pubis. *A want of attention to this point will cause a failure of the operation;* yet death may occur from a perforation of the bladder. The patient must lie the greater part of the time on the back, and, if possible, preserve this position until after the sutures have been removed. The catheter must be removed several times a day for the purpose of cleaning it. It is well to have two catheters, so that one may be introduced *immediately* on the removal of the other. A sufficient quantity of opium should be administered *daily* to keep the bowels constipated, until the sutures are removed. The catheter must be continued in use for a few days longer, and from the fourteenth to the twentieth day the patient may sit up."

Dr. N. Bozeman uses the elastic catheter, which he prefers to all others on account of the comfort of the patient and "the ease," as he says, "with which it can be kept open without removal, simply by running a wire through it."

In the face of such authorities and precedents, it will probably be considered a bold innovation when I recommend, *not only the abolition of the catheter* of whatever material or shape it may be constructed, *but also* (the removal of the sutures excepted) *all other parts of the after-treatment.*

In 1866, after operating on a case of vesico-vaginal fistula, I was obliged to abandon all after-treatment. I will give the case

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as it was published in the *New Orleans Medical Record*, then edited by Dr. B. Dowler, of this city.

"Case XVI. Vesico vaginal fistula, transverse diameter 20 millimetres, longitudinal 5^{mm}, cured in one operation, *dispensing with after-treatment.*

"A. D., a native of Germany, 38 years old, a primipara, was confined with child on the 17th of March, 1865. Her labor being very tedious a physician was sent for. Failing to deliver her with the forceps, I was summoned to her assistance. When I arrived I found the patient nearly exhausted, complaining of great thirst, and suffering greatly. Her abdomen was much distended, pulse frequent and feeble. Finding that the woman had an unusually contracted pelvis, and that the fœtus was in all probability dead, I applied the cephalotribe, previously administering chloroform. A profuse hemorrhage ensued after delivery. The uterus did not contract. Ice was therefore applied to the abdomen, and ergot given internally. Patient vomited a good deal during the day; the pulse in the evening 160 and small. The application of ice was continued during the night, being also given by the mouth. The next day patient suffered much from hiccough, pulse in the evening 75 and more full. Great tenderness of the abdomen, uterus more contracted. Ice was continued till next day. Patient recovered gradually, but not without the formation of a vesico-vaginal fistula. I operated upon this fistula three months subsequently. The patient living in very humble circumstances, submitted to the operation only upon the condition that I would not confine her to bed, as she had to attend to the wants of her household. I acceded to her request. The fistula was closed by five interrupted silver wire sutures; no catheter was applied, no water injections made, she attending to her work as usual. I visited her every day. She passed urine frequently, of which none came away but by the natural outlet. Ten days afterwards, when I removed the sutures, the fistula was obliterated and has remained so."

In an epicrisis of the cases published in the same Journal, I then said: "I have made a trial of doing away with both catheter and bed, with a successful result; but I am not prepared yet to advance an opinion based upon a single fact, and recommend, as some have done, the abolishment of that part of the after-treatment which has been considered as of the greatest importance, *though it may prove in the end to be nothing but a great bugbear.* The happy result obtained in the case referred to, induced me to abandon the after-

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treatment in all subsequent cases which came into my hands. I have since operated upon six cases, five of which have been cured in one operation, and one is still under treatment. Three have been operated upon at the Freedman's hospital of this city, under the direction of Dr. Schwarzwalder. In one of these cases hospital gangrene destroyed a great portion of the vagina and bladder after the operation. The case underwent a second operation, and notwithstanding the great loss of substance which had taken place, the extensive opening through which the bladder protruded was nearly closed, only a small fistule remaining, which I have no doubt will be closed next time. In all these cases, I used the silver wire twisted suture, and the women quitted the operating table without further interference, excepting the removal of the sutures. There was no confinement to bed, no catheter applied, no dieting; in a word, no after-treatment, and still a perfect success was obtained."

There is another case in my experience, where the same result was obtained. The patient was operated upon by Dr. Samuel Choppin of this city. After he had failed in two operations with the button, as well as the twisted silver wire suture, to close the fistula, he, at my request, after the third operation, abandoned the catheter and after-treatment. The woman was allowed to walk about. She passed the urine without even the temporary application of the catheter, and still that operation proved to be the successful one. I do not want to insinuate that the operator succeeded *because* he had given up the catheter and after-treatment, but that he succeeded *though* both had been abandoned.

Knowing that innovations are generally received with distrust and frequently opposed, though without any better reasons than that they are not generally adopted, or that they are in opposition to already naturalized ideas, or that they are not born out by a sufficient number of facts, I am happy to find succor from the other side of the waters to support me in advancing principles so strange and new in their character. G. Simon, of Heidelberg, in the above-mentioned article, says: "The after-treatment, so tiresome to the surgeon and tormenting to the patient, I have simplified to such a degree as to molest neither of them, and by which those essential elements of the present *modus operandi*, which are noxious to a cure, are relinquished. I make no more use of the permanent application of the catheter for drawing off the urine, in order to avoid the motions of the bladder by its being filled and emptied,

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but I permit the patient to discharge the urine as in days of health. Only in those exceptional cases in which the patient is unable to discharge the urine, which happens occasionally during the first twenty-four hours after the operation, the catheter is applied, when the necessity arrives. Equally in all other points the patient is treated as in health. The stools are not retained artificially, the patients may eat what they please and take any convenient position in bed. Yes, I have not unfrequently permitted them already twenty-four hours after the operation to quit the bed and walk about. This negative after-treatment, which was in opposition to the teachings of surgeons of all countries, I have already advocated in 1860, and since mentioned in all my writings, supporting it with observations proving the innocuousness of the urine and of the normal motions of the bladder in being filled and emptied, and I have, on the other side, pointed out the disadvantage of the permanent application of the catheter in causing catarrh, irritation, spasm of the bladder, and I have mentioned the danger of an abnormal distension of that organ from a possible obstruction of the instrument." In a note of that article Simon further says: "The priority of the after-treatment without the permanent application of the catheter is unquestionably mine. After I had proved it in 1860 to be rational, and in 1862 as the only proper one, it met with many contradictions, and it is only slowly adopted by other surgeons; but it will nevertheless soon be universally adopted, since not only on my part, but also by other operators, excellent results have been obtained. In Germany it is followed by the majority of surgeons. In England by Spencer Wells, to whom I sent my treatise of 1862. He has adopted it and uses also the silk sutures. In France, Courty has lately dispensed with the catheter." Speaking of this country, Simon mentions the case of my own, which I have referred to in a preceding page, but making the remark that though I had met with an excellent result, I nevertheless had disapproved the after-treatment without the permanent application of the catheter, a method which I erroneously had attributed to Spencer Wells.

The only notice of an author, who had advocated the abandonment of the catheter at the time when I published my treatise, I have seen, was in a short article, in the *British and Foreign Medical and Surgical Review*, of Spencer Wells, who based his opinion on an accident which had happened in Belgium in a case where the bladder had been perforated by the catheter. Not having been

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taught by my experience to look upon the catheter as so dangerous an instrument, and as the arrival of one swallow does not indicate summer, I was probably justified at that time in being cautious to recommend a method which, to say the least, was in opposition to all authorities known to me. Deprived during the war in this country of the sources which might have taught me the progress the operation of vesico-vaginal fistula had made in Germany, I find a sufficient excuse for my ignorance of the literature of that country at that period. Without disputing the priority claims of Simon, I may still assert that I have arrived at my conclusions without being aware of the important researches of that eminent surgeon.

Now, in the face of such indisputable facts as those which I have adduced, can a surgeon really be serious in still maintaining the opinion that his success in the operation of vesico-vaginal fistula rested either in the material he made use of for the sutures, or in the mode of their application, or in a proper and carefully conducted after-treatment? When one surgeon uses exclusively silk sutures, the other metallic wire; when one makes a knot, the other a twist, and a third uses another contrivance, and when in a large and nearly equal number of cases all three are equally successful in their operations, where, I inquire, is the man, if he be not lashed like Mazeppa to his pet hobby so that he cannot dismount, who will not arrive at the conclusion that the success in this operation cannot rest in the exclusive use of one or the other material, in one or the other mode of its application? When the abandonment of the after-treatment does not diminish the favorable results of the operation, who will still advocate it and retain its use when it is the most tormenting part of the treatment to the patient as well as to the surgeon? I therefore repeat it, bring a sufficient raw surface of the edges of the fistula in close coaptation, and whatever method of operation may be used is of minor importance. A surgeon without that proper skill will fail, whatever method or material he may employ; otherwise he will be successful, provided that there is not a constitutional impediment in the patient or some obnoxious cause inimical to healing by the first intention; accidents we meet with so frequently in practice that it would seem rather strange to expect an exemption in this operation.

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REPORT OF THE SECTION

ON

Meteorology, Medical Topography, and Epidemic Diseases.

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REPORT OF THE SECTION

ON

METEOROLOGY, MEDICAL TOPOGRAPHY, AND EPIDEMIC DISEASES.

TUESDAY, May 4, 1869.

THE Section was called to order at 4 o'clock P.M., by the Secretary, Dr. N. S. DAVIS, of Illinois.

On motion of Dr. A. B. PALMER, of Michigan, Dr. GEO. BURR, of New York, was elected Chairman of the Section, and Dr. N. S. DAVIS, of Illinois, was re-elected Secretary.

The Secretary stated that five papers had been referred to the Section for consideration, and read the by-laws and ordinances defining the duties of Sections in the consideration of the reports and papers referred to them.

The report of EDWARD CURTIS, Assist. Surg. U. S. A., *On the Cryptogamic Origin of Disease, with Special Reference to Recent Microscopic Investigations on that Subject*, was read by the Secretary.

Dr. A. B. PALMER, of Michigan, moved that the report of Dr. CURTIS be referred to the Committee of Publication, and that the Committee be continued, with the addition of Dr. JOHN S. BILLINGS, of the U. S. Army. After some remarks from Dr. PALMER in relation to the importance of the subject and the difficulties attending the necessary investigations, the motion was adopted.

Dr. WM. F. THOMS, of New York, presented and read his report concerning the epidemic diseases of that State. The report was very brief, relating to the effects of crowding and cellar population on the ratio of mortality.

The subject was discussed by Drs. PALMER, of Michigan, BURR and SELL, of New York, and others.

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On motion, the paper of Dr. THOMS was referred to the Committee of Publication.

The Section then adjourned until Wednesday, 3 o'clock P.M.

WEDNESDAY, May 5, 1869.

The Section was called to order by the Chairman, Dr. GEORGE BURR, at 3½ P.M.

The minutes of the last meeting were read and approved.

The Secretary read the report of Dr. R. C. HAMILL, member of the Standing Committee on Climatology and Epidemics, on the mortuary statistics of Chicago. After some remarks by Drs. A. B. PALMER, NELSON L. NORTH, and N. S. DAVIS, the report was referred back to the author, with the request that he would continue on the Committee, and make a more complete report next year.

Dr. N. L. NORTH, of Brooklyn, special committee, presented a report on the prevention of zymotic disease. After a full reading of the report, on motion, it was referred to the Committee of Publication.

Dr. JAS. F. HIBBERD, member of the Committee on Climatology and Epidemics for the State of Indiana, reported that he had been unable to gather the materials for a report.

The report of Dr. T. J. HEARD, of Texas, member of the Committee on Climatology and Epidemics, was read by the Secretary, and discussed by Drs. BURR, PALMER, and others.

The remarks of Dr. PALMER were directed mostly to criticism of that part of the report relating to the prophylactic powers of quinia and alcohol, the facts adduced showing the latter article to be in nowise reliable, if not worse than useless, and that quinia could not be continued too long without injurious results.

Dr. HEARD replied, claiming that cases had come under his personal observation in which quinia had been taken as a prophylactic every year for a long life.

Dr. REYBURN, of the District of Columbia, stated that he saw alcohol given in several thousand cases for prophylactic and sustaining effects against the influence of malaria during the recent war, but without any beneficial results.

Dr. DAVIS stated that mere expressions of opinion concerning the prophylactic effects of any article, based on general observations only, are of no real value. Reliable results on such subjects can only be obtained by careful statistical records, embracing large

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numbers and affording fair comparisons. He therefore moved that the report of Dr. HEARD be referred to a sub-committee, with instructions to erase so much of the report as relates to the prophylactic effects of remedies, and transmit the remainder of the report to the Committee of Publication. The motion was adopted.

The Secretary presented and read the report of Dr. F. W. HATCH, of California, member of the Committee on Climatology and Epidemics, which was read and referred to the Committee of Publication.

The Section, having no more papers before it, adjourned.

N. S. DAVIS,
Secretary of the Section.

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ON THE

CRYPTOGAMIC ORIGIN OF DISEASE,

WITH

SPECIAL REFERENCE TO RECENT MICROSCOPIC INVESTIGATIONS ON THAT SUBJECT.

BY

EDWARD CURTIS, M.D.

ASSISTANT SURGEON U. S. ARMY.

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CRYPTOGAMIC ORIGIN OF DISEASE, WITH SPECIAL REFERENCE TO RECENT MICROSCOPIC INVESTIGATIONS ON THAT SUBJECT.

SURGEON-GENERAL'S OFFICE,
WASHINGTON, D. C., April 19th, 1869.

WM. B. ATKINSON, M. D.,
Permanent Secretary of the American Medical Association.

DEAR SIR: At the last annual meeting of the American Medical Association, I was entirely unexpectedly to myself, appointed a Committee to report on the "Cryptogamic Origin of Disease, with special reference to recent microscopical investigations on that subject." In attempting to preface such a report I have thought that the Association desired not a mere synopsis and *ex cathedrâ* criticism of the published labors of other workers in this direction, but rather original observations and experiments to sustain or confute, as the case may be, the many theories and assertions that have been advanced in reference to the supposed causation of disease by cryptogamic plants. Be this as it may, I have not considered myself competent to discuss and criticize the varied and contradictory opinions and observations that have been already promulgated on this much-vexed subject, without familiarizing myself practically with the difficulties and sources of error with which its study is beset. I have, therefore, in conjunction with my friend Dr. John S. Billings, U. S. Army, devoted such time as has been at my disposal during the past year to the practical study of the natural history of the lower cryptogams, and, so far as I have been able to obtain material, to investigating, the supposed connection of vegetable gums with the tissues and fluids of the body in disease. But the subject of the relation of cryptogamic plants to disease is so vast: the practical difficulties in the way of conducting reliable experiments are so great: and the opportunities in Washington of procuring proper material for investigation are so meagre, that there has not been time in one year to obtain results

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sufficiently decisive to warrant the expression of a scientific opinion. I am not, therefore, prepared to submit any report at this session of the Association.

Dr. Billings and myself, however, propose continuing our investigations in this direction, and if it should be the pleasure of the Association that the Committee on this subject be still maintained, I would respectfully submit the following suggestions:—

1st. That the attention of the profession generally be called to the importance of positively proving or disproving the notion of the causation of disease by fungi or algæ, and to the fact that such proofs can only be afforded by the concurrent testimony of great numbers of experiments and observations.

2d. That therefore such physicians as have the time and means be invited to themselves undertake investigations in this direction; and that those who have not such opportunities be requested to forward to me [at the Surgeon-General's Office, Washington, D. C.] for experiments, samples of the fluids from the bodies of patients dying of any of the diseases reported to be of cryptogamic origin:—such samples to be obtained, and put up in the manner that will be described further on.

In connection with these suggestions it may not be out of place to offer a few remarks as to the general aim and method of such investigations as are here proposed. Certain diseases, as cholera, small-pox, and the fevers generally, are supposed by some, and asserted by others to be caused in some way by the presence in the economy of certain forms of fungi. Now apart from useless theorizing and speculation, the proof or falsity of these suppositions can only be proved by great numbers of reliable observations bearing on the following points:—

1st. Do there exist in the tissues, fluids or excretions of the body in cases of these diseases, recognizable forms of cryptogamic vegetation?

2d. In lieu of the above, do there exist in such cases various molecules, granules, or what not, which by appropriate treatment can be ultimately made to develop into well-known fungi, and thus prove themselves to be special forms of cryptogamic germs?

3d. Supposing the invariable presence of recognizable or unrecognizable forms of cryptogamic vegetation in cases of these diseases to be absolutely proved, is it yet certain that they *cause* the disease, and if so, how?

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To answer the first query we only require careful and conscientious microscopical examinations of the *fresh material*, by observers who are not too anxious to use the "highest powers of the microscope," but who are competent and willing, with a good working glass, to distinguish a spore from an oil-globule, and a mycelial thread from a shred of connective tissue, or a filament of coagulated fibrin. Such observations, made by careful and unprejudiced men, would soon either lift into permanent existence in the text books, or sweep from their ephemeral life in the journals, all those forests of fungi and shoals of algæ, that flourish so luxuriantly under the object-glasses of so many hard-worked microscopes in professional laboratories.

But while it *ought* thus to be a matter merely of time, care, and patience to answer our first query, it is far otherwise with the second. Here the fungus is asserted to be present during the disease only *in posse*, not *in esse*, and, therefore, to require for its development into recognizable form a subsequent "cultivation" of the morbid fluids and tissues of the body. And the practical difficulties in the way of conducting these cultivations so as to obtain reliable results are almost insurmountable. If the perfect plants into which these minute granules or "mocrococci" of Hallier and his disciples are asserted to develop, were special, or even rare forms of fungi, the matter would not be so hopeless; but no! the plants that produce these deadly effects as "micrococci" are, in their perfect development, the innocent green mould that we relish in our cheese; the blue mildew that overruns old leather or woollen in our cellars; the delicate mould that springs up like magic on a rotten tomato or potato, and the common rust or smut that commits such ravages in the wheat and corn-fields. In other words, the peccant fungi are those which of all others are the most widely and *abundantly* diffused; the most indifferent as to the nature of the soil they grow on, and whose spores are most tenacious of their vitality! What, then, has the experimenter to do? His object must be to discover if the diseased tissues and fluids removed from the body and kept moist and warm in an "isolation apparatus," will produce a fungus which will *not* develop on healthy tissues and fluids, treated in precisely the same manner. In these experiments, the suspected matter is to be inclosed in the isolation apparatus either alone, or with the addition of some material, as potato, lemon, sugar solution, etc., to serve as a soil for the fungus to grow upon.

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Now it is evident that to conduct such experiments satisfactorily, the ubiquitous spores of these common moulds have to be fought at every step to prevent their fortuitous introduction into the material to be experimented upon or the apparatus. Thus the experimenter, if he hopes for decisive results, must remove from the body some blood, or urine, or contents of the intestines, without exposure of the same to the spore-laden atmosphere; must insert it into some vessel whose walls and *contained air* have been thoroughly purified from accidental spores; then bring it into contact with some organic substance in which also all pre-existing spores have been absolutely destroyed, and, finally, inclosing a considerable amount of absolutely sporeless air, cork up the apparatus by a spore-proof joint! Now it is certainly not saying too much to assert that it is simply impossible to perform this complex operation with such faultless precision that we can be absolutely and mathematically certain that no single sly *penicilium* spore could have slipped into our material or apparatus at any stage of the procedure. When, therefore, even in spite of the most extraordinary precautions, and most complicated apparatus, a patch of mould *does* make its appearance on the surface of the suspected matter in the apparatus, we have still the right—nay, it is still our duty—to deny the scientific conclusiveness of any one, two, or even one or two dozen such experiments, standing by themselves. In such a matter our reliance must be, not on the extreme care with which any one series of experiments have been conducted, but rather on the average concurrent testimony of a very large number of varied experiments, undertaken always on diseased and healthy material placed side by side, and with the conditions varying as far as the laws regulating the development of fungi will permit. In conducting these culture experiments, therefore, all kinds of apparatus may be advantageously employed, from a simple corked bottle to the elaborate "isolation apparatus" of Hallier; bearing it in mind that fungi require for their development a moist *atmosphere*, and a moderately warm equable temperature. But whatever be the apparatus for culture, it is of prime importance that we have, if possible, a means of procuring the fluids to be experimented upon free from contamination, and of keeping them unchanged and isolated until such time as they may be wanted for use. For these purposes it is believed that the following simple contrivance will prove entirely satisfactory, where the fluid in question is to be derived from the dead body. Take a

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piece of glass tubing sufficiently small in calibre, and soft to be easily worked, and seal one end of it by heating it in the flame of an alcohol lamp, or a Bunsen's burner. Then directing the flame along the tube from this end, heat it red hot for a distance of two or three inches; and, at that point, *while the glass is still red hot*, rapidly draw the tube out to a fine thread and melt it across. We have thus a tube hermetically sealed and drawn at one end to a finely-tapering point. Having been closed when red hot all contained germs have been burned up, and the cavity of the tube, when cool, will present a partial vacuum. Now suppose it is desired to obtain some blood from a subject for experimentation. Lay bare the jugular vein, and have an assistant press upon it at each extremity of the neck so as to render it turgid. Make a small puncture into it, and while the blood is flowing outwards pass in the long thin end of the sealed tube an inch or more. Then break off the tip end of the tube while it is still in the vein, by pinching it through the walls of the latter. The existence of a vacuum in the tube will cause the blood to rush in till, if the tube has been properly made, it is quite three-fourths full. Then holding a lighted alcohol lamp or common candle close to the orifice in the vein, withdraw the point of the tube from the vein directly into the flame and hold it there until again sealed. Blood thus procured will coagulate and then remain unchanged, and here at least there has been no possible chance of introduction of vegetable germs from without. Urine, fluid contents of the intestine, etc., may readily be obtained by the same means. These tubes can be easily packed in little boxes, and transmitted by mail, and should I be favored by contributions of morbid fluids, I would request that they be drawn in this manner from the body, and sent in the sealed tubes.

With respect to the third point to be investigated, namely, what proofs can be obtained that vegetable germs, supposing them to exist in the economy in certain diseases, yet *cause* the disease? a vast field of most difficult labor is opened to the experimentalist. He must aim, having found his fungus, to isolate it in the form in which it occurs in or enters the body, and then by administration or inoculation of it alone, to reproduce the disease in question. Such alone would be a decisive test.

In concluding this letter, I would respectfully suggest, if the Association desires the continuance of the Committee on this sub-

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ject, that the name of Dr. John S. Billings, U. S. Army, be added thereto, since he has been, and will continue to be, a co-laborer with myself in this direction.

Very respectfully,

Your obedient servant,

EDWARD CURTIS,

Assistant Surgeon U. S. Army.

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REPORT

OF THE

COMMITTEE ON CLIMATOLOGY AND EPIDEMICS FOR THE STATE OF NEW YORK.

BY

WILLIAM FAULDS THOMS, M. D.,
CHAIRMAN.

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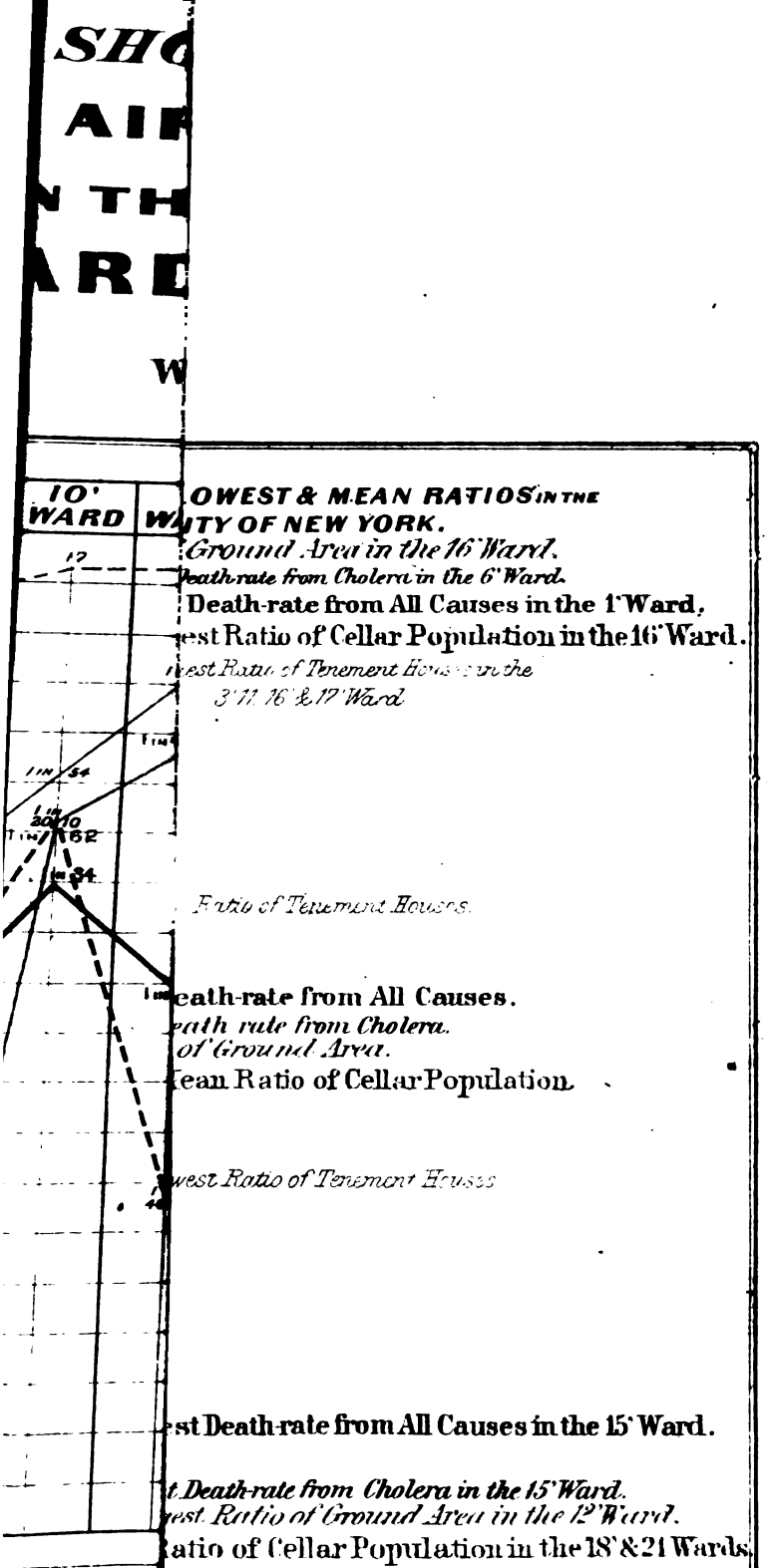
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OWEST & MEAN RATIOS IN THE
TY OF NEW YORK.
Ground Area in the 16 Ward.
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REPORT OF THE COMMITTEE ON CLIMATOLOGY AND EPIDEMICS FOR THE STATE OF NEW YORK.

YOUR Committee would respectfully report that they have collected and arranged in the form of a chart the most accurate facts in regard to the influences which increase the death-rate in the various wards in the city of New York.

It will be observed that in those wards where the largest proportion of cellars occupied as tenements exists, the death-rate is the largest.

In one of these dark, damp cellars, 18 feet square and 7 feet in height, lived a family of seven persons. During one year, two died of typhus, two of smallpox, and one has been sent to the hospital with erysipelas. The tops of the windows of this cellar are below the level of the street. Many of these cellars are occupied as lodging houses: at time of visit to one of them, there were fourteen persons present, several of them in bed. The cubic feet of air space to each person was only 67 feet, when it should have been at least 300. But for the broken window and dilapidated door they must soon have smothered in the foul air thrown off from their own lungs.

Another cause of the increased death-rate in many of the wards is the want of proper ventilation of the rooms in tenement houses. Many of the cases of pulmonary diseases which are met with can be traced to this defect. These houses have a common hall and stairway, going through the centre from basement to attic, which in nearly all instances is not properly ventilated, and in consequence acts as a conductor of contagious and epidemic diseases: so that typhus and typhoid fevers, variola, scarlatina, and rubeola occurring in the lower stories not unfrequently pass from floor to floor until they reach the top, which is often the fifth or sixth story.

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REPORT

ON

PROPHYLACTICS IN ZYMOTIC DISEASES.

BY

NELSON L. NORTH, M. D.,

BROOKLYN, NEW YORK.

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REPORT ON PROPHYLACTICS IN ZYMOTIC DISEASES.

THE paramount object of every physician should be to *prevent disease.*

Zymotic or contagious diseases are a *preventable* class of maladies. Many diseases which were once thought to be mysterious visitations of some good or evil spirit, are now acknowledged to be *contagious,* or, to say the least, *communicable,* and hence *preventable* disorders.

It is now very generally believed that *cholera Asiatica,* instead of being caused by some peculiar and mysterious atmospheric influence, is propagated and communicated through the operation of definite laws, as susceptible of being understood as the laws governing the spread of smallpox or scarlet fever.

As we read, with a scarcely suppressed smile, the teachings of the *sages* of ancient times, wherein they talk *so* learnedly of the part played by the sun, moon, or stars in the production of epidemic, and diseases in general, and the amusing directions for the control or cure of the same, so may generations to come, when the hidden things of the present shall have been traced to their causes, and the laws governing them shall have become easily demonstrable, smile at the ignorance of *our* wise men when they talk of the *mysterious* causes of epidemic influences.

The physician who cares *only* for the sick, be he ever so attentive, does but half his duty: he ought also to watch that he may prevent further disease. He is a very shiftless and thriftless husbandman who would simply pull up the full-grown weeds from among his crops, and not acquaint himself with the character of the seeds, and the manner of the growth, and the best means of destroying and preventing the development of these enemies to his prosperity. So the physician, if he would fulfil his *whole* mission, must search to know the best and most successful means of destroying the germs of disease.

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The official records of the number and causes of the deaths in New York city, for the thirteen years from January 1, 1851, to January 1, 1864, as given by Dr. Cyrus Ramsey, Register of Records and Statistics, show a total of (285,597) two hundred and eighty-five thousand five hundred and ninety-seven deaths from all causes, and eighty-nine thousand two hundred and sixteen (89,216) deaths from zymotic diseases, giving an average for all that period of (31.23) thirty-one and twenty-three hundredths per cent. of the mortality from zymotic, or preventable diseases. Again, we find that the deaths in New York city for the twelve months ending September 28, 1867, according to the report of Dr. E. Harris, Sanitary Superintendent Metropolitan Board of Health, were, from all causes, twenty-three thousand four hundred and forty-three (23,443), and those from zymotic diseases six thousand eight hundred and eighty-four (6884), being (29.36) twenty-nine and thirty-six hundredths per cent. from the contagious diseases; and from Dr. R. C. Stiles' report for Brooklyn, New York, for the same twelve months, we find that the whole number of deaths were eight thousand two hundred and thirty-six (8236), and from zymotic diseases alone two thousand five hundred and two (2502), or thirty and thirty-eight hundredths per cent. (30.38) of the deaths from *preventable* causes.

It would seem that the standing rebuke of such figures, and the continued repetition of the same in the weekly, monthly, and yearly mortuary reports of our health boards and health officers, showing that from a quarter to a half and sometimes two-thirds of the recorded deaths are the result of preventable diseases, would certainly arouse the profession to more activity, not only in searching the more diligently to know how to prevent diseases, but as well to be the more determined to put in practice the knowledge they already possess, as to the use of prophylactics in disease.

It is a fact that a great many efforts *have* been made to find preventives for zymotic diseases, and especial attention has been given in search of a prophylactic for scarlatina, and we submit *that it is not impossible that the great cause of failure has been a search for a* SPECIFIC preventive, analogous to the vaccine disease for small-pox. Belladonna has been tried in various forms, and in all sorts of doses, with a view of producing a modified form of scarlatina, that should protect the system from an attack of the severer or malignant type of the malady. The result is almost universally deemed a *failure;* and the profession have come to look upon the

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whole subject of prophylactics in these diseases as greatly speculative and fanciful.

It cannot, however, be necessary to enter into any detailed argument to prove the proposition that zymotic or contagious diseases are preventable; every physician, aye, and every sane person, cannot but know that if a well person is kept *far enough away* from the sick and the surroundings of one suffering of a contagious disease, the prevention in that case is *certain.*

The physician also *knows* that if he can *destroy the poison* which is the communicable cause of contagious disease, he can in that way prevent an attack of the same.

The report of your Committee on the subject of Prophylactics in Zymotic Diseases, assumes shape, then, in the consideration of two points, viz:—

The *isolation* of *the sick* of contagious diseases, and the destruction of the materies morbi.

The first remark in the consideration of these points is that to accomplish anything in this direction, we must have the people as allies; they must do the larger part of the work; while physicians must be teachers, the *people* must be taught the difference between a demoralizing "running away from a taking disease" and a deliberate, cautious isolation of the sick. They must be taught the difference between boldly facing and overcoming a contagion by destroying its germs, and a daring foolish exposure to the same lest they be considered cowards. A soldier in battle without weapons is not only of no service, but positively a hindrance—in the way. So the friends of the sick in crowding around him, if they can do nothing, expose themselves uselessly and harm the patient as well. An eminent sanitary authority in New York has well said, "The excessive waste of human lives in the metropolis is clearly proved to be dependent mainly upon preventable causes that cannot be permanently overcome, without persistent effort to give examples and practical instructions in hygiene."

A second remark in this connection is, that legislatures must be encouraged to pass laws giving sufficient authority to boards of health, and health officers to make strict rules and regulations, to govern *physicians*, as well as the people, in regard to *isolation* and the use of preventives, and also in regard to the careful reporting to the health authorities of all serious zymotic diseases, stating the type of the disease, the care of the patient, and what measures are being taken to protect the well, and afterwards to see to it that

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such authorities do not become careless or indifferent as to the enforcement of their own enactments.

The Metropolitan Board of Health of New York, nearly two years ago, moved in this direction by requiring physicians within their district to report to them the names and residences of all patients suffering from contagious diseases, and although no directions were given, and no intimations of their intentions made public, yet the simple promulgation of the order had a decidedly salutary effect upon the community, from the fact that more care was taken to ventilate and cleanse the sick-rooms, and physicians, who interested themselves enough in the matter to give directions to parents and attendants in regard to isolation and the use of disinfectants, found such directions very much more carefully followed when there was even a slight possibility of a visit from a health officer; it has consequently been a source of much regret to such medical men as were expecting valuable statistics, and definite results as to the prevalence of such diseases and the value of disinfectants or other preventives therein, when it was found that the order was (as it is now) fast becoming a dead letter from lack of stringency in its enforcement.

Your Committee do not deem it necessary to take up the subject of isolation of the sick in detail, as that would include the whole subject of quarantine, a matter which has already received so much attention, and has been so ably discussed in this Association by such distinguished men as Dr. Harris, Dr. Marsden, and others.

It is proposed only to call the attention of the gentlemen present to the propriety of carefully surrounding infected districts, and "barricading," with legal enactments and official restraint, all *infected dwellings* or *parts* of *dwellings*, and all *persons*, whether *sick* or *well*, if they have come within the influence or contact of the poison, until such places or persons have been thoroughly *cleansed*—disinfected—that is, until the communicable germ of such disease shall have been destroyed.

It will not be necessary to attempt to prove here that such "germs of disease" may be destroyed, when we remember that heat above the boiling point—carbolic acid, permanganate of potassa, sulphurous acid, and numerous other disinfectants, will destroy the subtle poison of cholera, and that simple "cold" will hold in check yellow fever, while superheated steam, and the above-named with other disinfectant articles will destroy the poison of, not only yellow fever, but typhus, typhoid, scarlet, and the other eruptive fevers.

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The more common objection to a thorough isolation of zymotic diseases is the interruption to trade, the check to business; this however, though potent and not easily overcome, is *not* a *valid* objection, from the fact that in the end, if a contagious disease be allowed to have its course, more interruptions to trade and business are caused by sickness and death than possibly could have resulted, if, from the beginning, the disease had been isolated and controlled.

As to the specific use of disinfectants for the cleansing of ships, houses, tenements, or other infected places or districts, nothing need be said, as the subject has been largely treated, and eminent and reliable authorities have placed on record their views as to the best disinfectant articles, and the best methods of using them.

The remaining point in the consideration of this subject, and really the only one from which we may expect practical results at present, under existing health laws and usages, is in regard to the *internal* administration of disinfectants (or anti-septics), in connection with a more thorough and more *systematic* external use of the same. It is proposed that these articles be administered both to the sick of zymotic diseases, and to the well who have been exposed to the poison of such diseases: to the *sick*, to prevent further ravages of the poison upon the physiological action, thus curing the disease by removing its cause; to the *well*, to *prevent any* action of the poison, and thus check the development of a pathological state. Your Committee believe, after some fair amount of experience, that a beneficial result may be expected from the administration of the alkaline sulphites in typhoid fever, and it is urged that a persistent and systematic use of these articles, or a preparation of chlorine, of iodine, of carbolic acid, or some positively disinfectant material, be administered in all cases of typhoid, typhus, and scarlet fevers, and, in fact, in all zymotic diseases whenever they assume in any degree the malignant type.

Scarlet fever, however, is *the* zymotic which is, perhaps, at the present day more dreaded, because more generally and more continuously prevalent, and in the aggregate *more fatal* than any other disease of the class under consideration. It is consequently a fair specimen upon which to experiment with a view of learning the prophylactic power of disinfectant remedies. It is also an encouragement to our efforts to prevent scarlatina, to know that if we can obviate its attack upon an individual in childhood, such person will *probably* never have the disease, as it is believed that not more than one in a thousand will ever have scarlet fever after twenty years

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of age (unless we fall into the too common impropriety of calling the sore-throat of the attendants upon scarlet fever—which may affect the same person an indefinite number of times—an attack of the disease).

The deaths in New York city from scarlatina, according to the statistics already referred to (on page 480), were, in the thirteen years from 1851 to 1864, inclusive, twelve thousand three hundred and fifty-three, a larger aggregate than from any other zymotic disease, except cholera infantum. In the report of Dr. R. C. Hamil, of Chicago, upon the epidemic diseases of Illinois, we find that the deaths from scarlatina in that State for eleven consecutive years averaged nearly *four per cent.* Dr. Parsons, of Providence, Rhode Island, in his statistical table of the epidemic diseases in that State, shows that the deaths from scarlet fever were many more than by *any* of the other zymotic diseases, and he found that a little more than one-twentieth of the deaths from all causes in Rhode Island for ten years were from scarlatina. Dr. Harris, of New York, in one of his reports to the Board of Health, says: "As a persistent and obstinate foe, *scarlatina* is more to be dreaded than Asiatic cholera." While Dr. R. C. Stiles, Sanitary Superintendent for Brooklyn, New York, speaks of scarlet fever as a "constantly prevailing disease."

From the first publication of the theory of M. Polli, of Italy, on the action of the alkaline sulphites in zymotic diseases, I have been deeply interested in the subject; and after having used the hyposulphite of soda to some extent in typhoid fever with very gratifying results, I determined to give the article a careful trial in scarlet fever, and after about five years' experience in the use of this and other disinfectants, I have come to believe that these are remedies of *great* value, and that with them it is possible to cure the disease when established in the individual, and to *prevent* an attack even after exposure to the contagion: not, however, as vaccination prevents smallpox, by producing a milder form of the same disease, but by destroying the poison and preventing the development of the diseased action.

Jenner's Great Discovery, Vaccination, was not the result of scientific research, but of simple observation—a happen so. The profession and the world do well to revere the name and honor the memory of one who so perseveringly followed up his discovery, until he had demonstrated beyond a reasonable cavil that vaccination was a great boon to the human family. Yet we submit, that

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as a class of men who claim to be scientific, the medical profession have no right to be waiting, Micawber-like, "for something to turn up," that shall have a scientific control over the other zymotic diseases such as that exerted by vaccination over smallpox. No. Careful study, patient and persevering research from effect to cause, and from cause to effect, and *then* rational and varied experiments, carefully and critically *watched*, must be made and remade until definite results shall be reached, such as the control or destruction of the cause or causes of these diseases.

In September last, I received the following letter from my friend Dr. W. F. Percival, of Aiken, South Carolina:—

"DEAR DOCTOR: I see, in a late number of the *Record*, an article of yours on the use of disinfectants in scarlet fever. In 1861 and 1862, I had a large number of cases of this fever under my care. The first cases occurring in a family were generally the most severe. My attention was drawn to the use of disinfectants in this way: In a severe and fatal case, I used chlorinated soda as a gargle and wash for the mouth. I had the bed sprinkled freely with it, before and after the death of the patient. Out of three other children in the house, but one took the fever. She had it very mildly. I kept up the use of the liq. soda chlorinata freely.

"In every family to which I was called, I adopted the same precaution with the first and each subsequent case; after the first case, the others were very mild. In one family where there were nine children the first case was very severe, three only of the other children had it, and they very mildly; no precaution was taken to keep the other children out of the sick-room.

"I have taken the liberty of sending you the above short detail of my observations in the use of chlorinated soda in this disease as a disinfectant, thinking it might possess some interest."

My friend, Dr. Gray, of Madison, New Jersey, related to me, some months since, that during an epidemic of scarlet fever in his neighborhood, he put together, more by mistake than otherwise, the iodide of potassium, sweet spirits of nitre, and water, and administered it to a scarlet-fever patient with such good effect that he tried again and again, and found such a decided improvement in his patients as to be altogether surprised and gratified; and after years of experience, he has come to trust this iodine mixture as his most reliable remedy in scarlatina.

DR. E. J. Blyth, of England, recommends a compound of chlorine and chloric acids in scarlet fever, stating that he uses it both as a

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remedy and as a *prophylactic*, and believes it almost invaluable. He says, "Let me urge my medical brethren to give a full and fair trial to my remedy. . . . I see no reason why every one using it should not be blessed with the same success that I have been, during many years that I have used this specific in an active and extensive practice." Dr. Keith, of Normandy, in a late letter to the London *Lancet*, advises the use of carbolic acid in large doses with tinct. opii, chloric ether, and water, for scarlet fever, measles, and smallpox, and thinks the effects very good. He says, "During the last six months I have given it in six hundred cases, of which only five have died," and thus we may find that in all modes of treatment, most reliance is placed (although often unnoticed) upon an article of the materia medica which is at once a disinfectant in its nature, or upon one the reaction of which produces a disinfectant.

On the 12th of Feb. 1865, I was called to a child of Mr. T., of Brooklyn, N. Y., the patient, aged one and a half years, was suffering from a severe attack of scarlatina anginosa. I gave five grains of the hyposulphite of soda dissolved in syrup and water, every four hours, and ordered that the well child, who was about three years of age, should have the same dose three times a day; the patient improved rapidly, and soon recovered; and the other child showing no symptoms of the disease, the medicine was discontinued.

Mr. B., of Brooklyn, has had a large family, all but two of whom have had scarlet fever, and suffered greatly. I was called in haste, Nov. 25, 1865, to see the younger of these two, and found a well-marked and well-developed case of scarlatina. I immediately resorted to the hyposulphite of soda for both the sick and the well one, and had the satisfaction of seeing the sick one recover rapidly from a severe form of the disease, with no other remedy than the one mentioned, and a chlorine mixture as a gargle for the throat.

The other child presented no symptoms whatever of the complaint.

Again, among my notes I find an interesting case commencing April 4th, 1865. Two girls of Mr. F., the one eight and the other two years of age, were the subjects. The eldest was taken sick with the fever, and I commenced giving, in connection with other remedies, the hyposulphite of soda in five to eight-grain doses every three hours, and three grains, three times a day, to the little one; when I myself was taken sick, and was obliged to ask a neighboring physician to take charge of these, among other patients. After three days I got about, and was advised to see the patient above

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named *early*, as she would probably die. I immediately returned to the hyposulphite treatment, which had been discontinued, and in twenty-four hours thereafter my patient was much improved, and had a rapid recovery. I also returned to the remedy for the little child, but unsatisfactorily, as it produced a cathartic effect and had to be stopped; about the seventh day she began to show signs of the fever, when I administered the hyposulphite in much smaller and oftener repeated doses. After three days of uneasiness with poor appetite and slight soreness of the throat, she began to improve and soon recovered. About the ninth day from the attack of the first child, a young miss of eighteen, who had never had scarlatina, began to complain of headache, sore throat, etc., and was much frightened, to her I gave ten grains of the hyposulphite every two hours for some sixteen hours when catharsis commenced, with relief of the symptoms. She continued the medicine ten grains a day, and in four or five days was entirely well. I desire, of course, that it be understood that my success is not always as above indicated, though of some thousand cases treated on the disinfectant plan, I have lost only three patients, and while the prophylactic results have not been nearly so satisfactory as could be wished, yet a part of the cause of failure is apparent from this one more extract from my notes: June 27, 1865, the youngest of a family of five children was attacked with scarlet fever of malignant type, and after a severe and protracted illness, finally recovered. The other children, although thoroughly exposed for the first two days, were after that placed in another part of the house and given the hyposulphite of soda, and all escaped the disease, until one year after when another one, having been again exposed, was taken sick with a mild form of the disease, which soon attacked the three others, no measures being taken to prevent it, demonstrating to me, as have a number of other cases which I will not take time here to notice, that *disinfectants may prevent the development of zymotic diseases* by destroying the poison present in and around the individual at the time, and not by any *specific* action upon the system, and, of course, ought always to be given if exposure have taken place, not for a *few days simply*, but for all the time the individual is so exposed. And I can come to no other conclusion than that the cause of failures in preventing zymotics is that individuals are exposed to and take the diseases, notwithstanding they have used proper and efficient prophylactics, because they are

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exposed either to the person or the clothing of the sick *after* they have *ceased to use* the prophylactic.

I am certain I have, again and again, seen an attack of scarlatina postponed through the use of the disinfectant treatment by the well children using the medicine, until the friends, thinking the time for the attack had so long passed, and the danger was so little, would either stop entirely or would become careless and indifferent in the administration of the prophylactic, when the disease would set in; and, hence, I have great reason to believe that *much* and perhaps in time *all* of the suffering from these diseases might be prevented if the medical profession and the health authorities would *insist* upon an *entire* separation of the sick of zymotic diseases from those unexposed, and a thorough external use of disinfectants about the persons, apartments, and clothing, and then a systematic administration *internally* to all exposed persons of such disinfectant remedy or remedies as may, in the given case, seem most appropriate—the one of the alkaline sulphites which is most recommended as a prophylactic is the hyposulphite of soda, a proper dose of which is from five to thirty grains, according to the age of the patient, three or four times a day; if too large a dose be given, or if repeated too often, it will prove cathartic, and a slight cathartic effect seems desirable.

A very valuable chlorine mixture for a prophylactic, and for anginose scarlatina, may be made as follows:—

Put ten grains of chlorate of potassa, finely powdered, in a pint bottle, cork it; add one drachm of hydrochloric acid; in a little time add an ounce of water, and shake; allow it to stand long enough to absorb the vapor, and then add water ounce by ounce (allowing some time between each) until the bottle is full. Of this a proper dose is from a teaspoonful to two tablespoonfuls with water, given according to circumstances from three times a day to every hour. Care should be taken, however, that the mixture be not given too long, as it may salivate some, and cause rheumatic symptoms in others.

A good and efficient iodine mixture (containing some free iodine) may be made extemporaneously by adding an ounce each of spts. ether. nit., and water, to one scruple of iodide of potassium, or it may be varied if the symptoms of a given case require it, by the use in the place of the water, of simple syrup, or syr. of tolu—ipecac. or squill, or other desirable sedative, expectorant, or even a stimulating article—and given in doses of from a teaspoonful to

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one-half a tablespoonful, from three times a day to every hour, if desirable.

Carbolic acid may be given in from one to five grains dissolved in a sufficient quantity of water or other vehicle.

In conclusion, gentlemen, your Committee would earnestly recommend that in all contagious epidemic or pestilential diseases it be deemed the duty of the medical profession to use all possible efforts to prevent the spread of the same, by advising the free use of disinfectants *both* internally and externally, and by using all appropriate occasions to educate the people as to their duty and their interests in the matter of isolating and destroying with disinfectants the *materies morbi* of zymotic diseases.

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REPORT

ON THE

CLIMATOLOGY AND EPIDEMIC DISEASES OF TEXAS FOR 1868.

BY

T. J. HEARD, M. D.,

GALVESTON, TEXAS.

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REPORT ON THE CLIMATOLOGY AND EPIDEMIC DISEASES OF TEXAS FOR 1868.

I MIGHT with propriety omit to report altogether on the epidemics, etc., of Texas for the year 1868, but for the fact that the medical history of the State would be incomplete should no mention be made of its sanitary condition for the year immediately succeeding so fearful an epidemic of yellow fever, and so general a prevalence of the ordinary miasmatic fevers as scourged this State in 1867. In the absence of any important material for my report, owing to our exemption last year from all epidemics and a great diminution of the endemic diseases usual among us, I shall have something to say in the course of this paper of what I take to have been the true causes of our unprecedented sanitary condition for the past twelve months.

The section of the State which has fallen under my immediate observation, viz., a belt lying parallel with the Gulf of Mexico and extending into the interior about one hundred miles, has been remarkable during the past year for a total absence of epidemics, and a degree of general salubrity exceeding anything which I have ever before known. It would seem that the morbific agencies had spent their full force during the fatal year of 1867, and that we have since enjoyed a calm until the fearful engines of death should be reproduced for our destruction.

The amount of rain and fog during the last year, in the belt of country above named, has exceeded anything in my experience. I regret very much my inability to obtain full and satisfactory meteorological observations for this region of the State, but am confident that throughout this region at least twice the quantity of rain has fallen during the last year as ordinarily falls during the same time. I herewith append some thermometric and hygrometric observations made at Galveston, by Dr. G. Dowell of that place: The range of temperature has clearly been lower than in

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1867, and, short of severe cold, rather uniform. Few calms have occurred, but the winds have been generally high, and have prevailed principally from the east, southeast, and northeast. The tides have been very high. The electrical condition of the atmosphere has been unusual, but very little thunder and lightning have occurred. The following inquiries were addressed by me, through the mail, to nearly one hundred of the most prominent medical men throughout our wide-extended State:—

1st. Has any epidemic prevailed in your section of the State this year (1868), and if so, what?

2d. Has any material difference been apparent to you between the diseases of 1867 and 1868? If so, in what respect have they differed?

3d. Has there been any material difference in the range of temperature, amount of rain, course of and force of the winds, between the years 1867 and 1868?

I regret to say that but few of those addressed have responded to my call for information. Dr. J. Somerville Burke, of Port Lavacca, in reply says, that no epidemic prevailed in his section during the year; that, with the exception of a few cases of dengue in June and July, there had hardly been any sickness of any kind. Dr. Burke very kindly procured the following carefully prepared tables of meteorological observations, which may, I hope, be found to possess considerable interest and value:—

Dr. James W. Fennell, of Seguin, reports to the following effect: There was no epidemic of any kind in this section during the past season, but miasmatic fevers were endemic until late in the fall from early in June, which is very unusual. When yellow fever prevailed east and south of us in 1867, there occurred in this immediate section, and chiefly in this county, fifteen or twenty cases of a form of fever which very closely simulated yellow fever. They were marked by extreme gastric irritability, black vomit, and severe pain in the head, back, and extremities. They yielded to small doses of calomel, with or without bismuth, ice internally, hot mustard baths, and twenty to thirty grain doses of quinine by enema every fourth hour. The above cases were exceptional; as a rule, the form of fever was mild. Miasmatic fevers were more prevalent during the past year (1868), than they have been at any time since 1856. Early in the season they were mild, but during the latter summer months, and even up to December, there was a large number of cases of the congestive or pernicious type. He

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states that, in the treatment of congestive fever, he has found chloroform the sheet anchor. He often employs it in combination with quinine. Separately or combined, however, it has never failed in his hands to relieve the congested state and establish reaction. The thermometrical range was not so high in 1868 as in 1867, though the atmosphere was usually sultry and damp. The quantity of rain was much greater than in the previous year. East winds prevailed to an unusual extent.

Dr. A. H. Parrish, of Austin City, reports no epidemic during the year and no apparent difference between the diseases of 1867 and 1868. He furnishes me a brief tabular statement of the maximum, minimum, and mean annual temperatures for the two years 1867 and 1868, and also the rain-fall for the same seasons, which is appended.

I am indebted to Dr. J. D. Rankin, of Palestine, Anderson Co., Texas, for a reply to my inquiries, of the contents which I will present a synopsis. Dr. Rankin reports the absence of any epidemic in his section of the State during the past year, but a marked difference in the character of the diseases of 1867 and 1868, which he connects with the difference in the prevailing winds, and the range of temperatures between the two seasons, the amount of rain not being materially different. In the fall and winter of 1867 the winds usually prevailed from the south, and the weather continued warm until the close of the year or later. In consequence, malarious diseases continued to prevail up to that period, while ordinarily they are arrested in the autumn, by cold and bracing weather with frost. The type of these diseases was, in the month of November and December, such as usually obtains in July and August, except that it was more adynamic in consequence of the debilitated constitutional condition caused by the protracted sickly season. During the past year (1868) malarial fevers of the usual character and extent prevailed throughout the summer, except in June, which was a very dry month, and free from febrile diseases. The autumn set in early, however, and was more than usually cold, and all active malarial diseases disappeared on its approach. The two seasons 1867 and 1868 presented widely different types of fevers. That of 1867 was of a marked inflammatory and dynamical character until, as before remarked, late in the autumn and winter, whereas that of 1868 was of a mild adynamic character. Of course the difference in character called for a corresponding difference in treatment.

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Dr. W. S. Hughes, of Danville, Montgomery County, has kindly furnished me a report of some length, of the chief points of which I present the following summary: He states that miasmatic fevers are the prevailing diseases of that section of the State, in the form of intermittents and remittents, the latter partaking more of the congestive type, and usually less amenable to treatment. The malarial element enters into and complicates all these diseases whether of an endemic or epidemic character. During some parts of every season, usually late in the summer and early in the autumn, these fevers become pernicious to a greater or less extent, when it is especially important that they be combated with great promptitude. Of course any epidemic appearing at that time becomes thoroughly complicated with the prevailing type which renders it more than ordinarily aggravated and fatal. This was notably the case during the prevalence of yellow fever, here in 1867, insomuch that it was mistaken by our best physicians for remittent and typhoid fever, presenting the characteristic appearances of the tongue in typhoid fever, with quick depressed pulse and evidence of bilious derangement of a miasmatic character. All the inflammatory diseases, too, that have occurred here during my practice of thirteen years, have partaken of, and been modified by miasmatic influence to such an extent as to indicate and require the treatment appropriate for that element of the case. Observation for some years, both in the state and elsewhere, has convinced me that yellow fever is much more virulent and fatal when transported from its original place of development on or near the sea-board into interior and more miasmatic sections of the country. The yellow fever poison is greatly complicated and modified in such localities, by miasmatic influences, especially at the season when these influences are at their maximum of intensity. Should not this fact materially change the treatment of yellow fever epidemics as they extend from their starting-points on or near the sea-board into more interior regions abounding in miasmatic influences, where specific and anti-periodic treatment is pre-eminently indicated? Owing doubtless to malarial complication and aggravation, the fatality of the yellow fever epidemic of 1867 both at this point and at Huntsville in the neighboring county of Walker was much greater than at Houston or Galveston. At this place more than half the cases proved fatal, while the mortality at Galveston was reported not to exceed fifteen per cent. The disease was introduced here late in the season at a period when from the excessive rains and high

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temperature the ordinary miasmatic fevers had assumed a congestive type, and thus partaking of and complicated with the local influences if proved rapidly and singularly fatal.

"I have to report the absence of any epidemic, for the year 1868. We have had, however, during the year a singular form of congestive disease, which it would perhaps be impossible to classify under any admitted variety of fever. It is sudden in invasion, without any decided febrile symptoms, but with a weak and depressed pulse, a comatose brain and evidences of profound hepatic congestion. Whether this peculiar form of disease belongs to the class of fevers or whether there is meningeal inflammation for the symptoms of it are by no means decided or well marked, I am not prepared to say. The treatment found most successful, consisted in the administration of large doses of mercurials, followed by full or sedative doses of quinine. The first served to unload the portal circulation by dark, copious, and offensive motions from the bowels, the latter prevented any secondary or reactive fever. The diseases in this section have prevented any material difference between the years 1867 and 1868. I am well convinced that all diseases have been gradually becoming more asthenic for several years past. Up to a recent period there was a large proportion of elderly person amongst us. Most of them have died within a brief period. Many of them were early settlers of the country. The gradual change of climatic influences rendering all diseases of more asthenic type than formerly, seems to have had an equally injurious effect upon the children of the vicinity in the increased fatality of their diseases, as upon the aged population. In reply to your last query. I have to remark, that there has been much similarity in the range of temperature, amount of rain, and course and force of winds, during the years 1867 and 1868."

Dr. Edward Merrill, of Waco, McLennan County, on behalf of, and as expressive of the observations and views of the Waco Medical Society, reports as follows: That no epidemic disease prevailed there during 1868, except hooping-cough of a mild character in the spring. That there was more tendency to cerebral disturbance and congestion in 1868 than in 1867. That while the number of cases of sickness in 1868 did not exceed one-third of those in 1867, yet the mortality was larger in proportion. That diseases of a malarial character were more tractable and less liable to relapse in 1868 than in 1867. That there was a greater prevalence of pneumonia in 1868. That, to speak in general terms, there was ob-

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served a less amount of disease, but a greater tendency to low continued forms of fever in 1868 than in 1867. Dr. Merrill has also laid me under obligations for a meteorological register for 1868, kept by himself, and which exhibits every mark of care and accuracy. It is herewith appended.

I regret much the paucity of material, and the want of more complete and positive data from which to attempt to draw a line of difference between the years 1867 and 1868. Let us call in the aid of meteorology, and to it assign the office of sentinel on the watch-tower of disease. Nor should it detract from the reliability of conclusions, because the nature and *modus operandi* of predisposing and exciting causes cannot as yet be satisfactorily demonstrated. Doubtless as meteorological science is more cultivated, and successive data are recorded with which comparisons may be instituted, much which now appears obscured may be made perfectly intelligible. But to the comparison of the seasons of 1867 and 1868. Both were remarkable for the great and unusual amount of rain. The year 1867 was remarkable for the violence of the winds, two severe storms, one of them of unexampled severity, having visited the seacoast. In 1867 there was also a very unusual amount of thunder and lightning. In 1868, on the contrary, the opposite of these conditions obtained, but the amount and density of the fogs exceeded any that I have before observed. But the most marked difference of features between the two years was in the range of temperature, that of 1867 being much higher than in 1868, as will appear on a comparison of the meteorological observations from various parts of the State, which are embodied in this report. When we compare the thermometrical range of the two years, the hygrometric state of the atmosphere being perhaps the same, we shall be prepared to appreciate the bearing of this fact in vital statistics, and to show that a high thermometrical range is essential *per se* to the development of yellow fever. It is a fact known to the chemist that the vinous fermentation occurs only at or below a given temperature, for example about 60°, while if this temperature be raised for example to 65°, the acetous fermentation will be the result. I do not doubt that it will yet be shown by careful observation that a given range of temperature associated with the necessary concomitants of moisture and animal and vegetable matter in the stage of decomposition are required in order to the generation of the fearful poison, which, when received into the human system, results in what is known as yellow fever.

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From Dr. A. H. Parrish, of Austin City.

	1867.	1868.
Mean annual temperature	68.41	66.99
Maximum "	98.	96.
Minimum "	17.	15.
Rain (inches and hundredths) . . .	27.19	40.09

Table of Temperature and Amount of Rain during the years 1867 *and* 1868.

Meteorological Register, by Edward Merrill, M. D., Waco, Texas. Observations at 7 A. M. and 2 P. M. and 9 P. M.

1867.

	Mean temp.	Rain in inches.	Wind.
April,	66°	5.80	S., S. E., E.
May,	73	6.50	S., S. E., E.
June,	83	2.80	E., S. E.
July,	86	2.30	E., S. E.
August,	84	4.00	N. E., S. E.
September,	81	1.80	S.E., N.E., E.
October,	70	2.10	
November,	59	2.98	N. W.
December,	60	2.30	N., N. W.
Average since—			
April,	73°	30.58	

1868.

	Mean temp.	Rain in inches.
January . . .	42°	.70
February . . .	46	2.20
March	63	10.60
April	67	5.40
May	76	3.70
June	83	1.10
July	87	1.40
August . . .	83	2.30
September . . .	77	2.80
October . . .	67	4.80
November . . .	54	3.05
December . . .	45	4.95
Average since—		
April	71	29.50
Year	66	43.00

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Thermometric and Hygrometric Observations during the year 1868, *at Galveston, by Dr. G. Dowell.*

Months.	Monthly Mean. Thermometer.	Monthly Mean. Hygrometer.	N No. of days.	NE No. of days.	E No. of days.	SE No. of days.	S No. of days.	SW No. of days.	W No. of days.	NW No. of days.	No. of days fair.	No. of days cloudy.	No. of days rain.	Rain in inches.
January.....	54.01	49.88	6.66	11.33	4.66	2.33	2.00	2.66	.66	.66	14.66	16.33	8	4.04
February....	55.96	53.65	1.66	11.23	4.33	3.66	6.00	1.66	..	.33	17.66	11.33	10	4.05
March.....	67.06	64.12	0.00	5.33	3 00	8.66	8.66	1.66	.33	3.33	19.00	12.00	5	5.58
April.....	71.52	69.41	1.00	3.66	2.00	6.66	10.33	3.00	.33	3.00	18.00	12.00	9	14.78
May.....	78.03	74.78	.66	2.33	3.00	5.00	15.00	2.33	.33	2.33	22 66	8.33	7	2.51
June.....	84.01	81.40	.33	3.33	6.00	6.00	11.33	1.33	.66	1.00	24.66	5.33	4	3.86
July.....	85.96	82.45	.00	1.00	9.00	5.66	3.33	7.66	3.66	.66	14.66	16.33	17	4 89
August.....	86.13	83.45	.00	.66	11.33	5.33	11.33	1.00	1.00	.33	25.66	5.33	6	3.58
September...	81.14	78.54	1.00	4.00	7.00	7.33	5.66	.66	.66	2 00	18.66	11.33	18	8.75
October.....	72.31	70.23	.66	10.00	6.66	7.66	.66	.66	.66	5.00	21.00	10.00	6	4.66
November...	61.51	59.08	1.33	4.66	2.66	1.66	2.33	1.33	1.33	8.00	15.00	15.00	8	3.66
December....	52.49	50.25	.66	5.33	3.00	9.33	.66	.33	1.33	11.33	18.33	18.33	13	8.01
	70.79	68.10	14.00	63.00	61.66	75.33	77.33	26.66	9.00	38.09	224.33	140.66	103	68 37

Thermometer, hottest daily mean 90.33, August 18th, 97 at 2 P. M. Thermometer, coldest daily mean 33.66, December 11th, 28 at 7 A. M. Decimals carried out at two points.

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Meteorological Report for the Month of June, 1868, recorded at Lavacca, Calhoun County, Texas.

Day.	Temp. at 8 A. M.	Temp. at 12 M.	Temp. at 7 P. M.	Mean temp.	Remarks.
1	80	84	80	81 1/3	Wind east; clear.
2	80	84	80	81 1/3	" " "
3	80	85	80	81 2/3	" " " light breeze morning.
4	78	85	80	80 1/3	" " " cool " "
5	78	85	81	81 1/3	" " " " " "
6	79	84	82	81 2/3	" " " " " "
7	78	85	81	81 1/3	" " " " " "
8	78	87	83	82 2/3	" " " " " "
9	81	88	81	83 1/3	North morning; shower before daybreak; east noon, and clear.
10	77	85	82	81 1/3	Northeast morning; south evening; clear.
11	77	85	82	81 1/3	Morning calm; east rest of the day; clear.
12	78	86	84	82 2/3	East all day; clear.
13	78	86	83	82 1/3	" " "
14	81	87	82	83 1/3	" " "
15	80	86	83	83	" " and light clouds.
16	82	87	82	83 1/3	" " showery at 10 A. M.
17	82	86	83	83 1/3	" " " " "
18	81	89	83	84 1/3	" " morning showery; 90° at 2 P. M.
19	81	90	84	85	" " " "
20	80	77	77	75	North morning; 10 A. M. southwest; 3 P. M. east; 6 P. M. north; rain morning and evening.
21	78	82	80	80	Easterly, and drizzling rain morning; evening clear.
22	76	79	79	74 2/3	" rainy morning; evening clear; about 1 1/2 inches rain morning.
23	76	83	77	78 2/3	Easterly; morning clear; shower 12 M.; morning clear.
24	76	82	80	79 1/3	North morning; east evening; clear.
25	80	84	81	81 2/3	Light clouds; east wind; clear.
26	78	84	82	81 1/3	East; clear.
27	81	85	82	82 2/3	" "
28	80	88	83	83 1/3	" " morning calm.
29	83	86	84	84 1/3	East; heavy thunder and showery 12 M.; 90° 3 P. M.
30	82	88	86	85 1/3	East; 92° 2 P. M.

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Meteorological Report for the month of July, 1868, recorded at Lavacca, Calhoun County, Texas.

Day.	Temp. at 8 A. M.	Temp. at 12 M.	Temp. at 7 P. M.	Mean temp.	Remarks.
1	82	89	85	85⅓	Wind south in the morning; east in the evening; clear.
2	82	86	82	83⅓	Wind east; clear.
3	80	79	76	78⅓	Wind southeast morning, and rain; 12 M. high wind; calm evening 7 P. M.; norther 74° 8 P. M.
4	75	80	80	78⅓	Wind northeast morning, and rain; 1½ inch rain in two days; cloudy, but no rain evening.
5	78	86	82	82⅔	Wind east; cloudy; shower at dark.
6	78	81	80	79⅓	Wind north 8 A. M.; east evening; cloudy and rainy all day.
7	80	86	82	82⅔	Wind east morning and evening; light shower morning; evening clear.
8	79	85	82	82	Wind east morning and evening; light shower morning; evening clear.
9	80	86	81	82⅓	Wind east morning and evening; light shower morning; evening clear.
10	81	88	83	84	Wind east morning and evening; clear all day.
11	81	83	80	81⅓	Wind east morning and evening; Rain in morning; clear rest of the day.
12	78	80	81	79⅔	Wind east morning and evening; cloudy and showery morning; cloudy in the evening, but no rain.
13	79	85	80	81⅓	Wind east all day; shower and cloudy in the evening.
14	78	78	78	78	Wind east all day; rainy from 8 A. M. to 12 M.; evening clear; cool all day.
15	74	81	80	78⅔	Wind east all day; shower in morning; cloudy in the evening.
16	80	85	80	81⅔	Wind east all day; clear day.
17	80	89	85	84⅔	Wind east all day; shower at 11 A.M.; clear evening.
18	83	89	86	86	Wind east all day; shower at 10 " " "
19	80	88	86	84⅔	Wind west morning; south at 12 M.; east and light evening; 92° at 3 P. M.; 130° at 12 M. in the sun.
20	80	92	86	86	Wind east; southwest evening; clear day.
21	81	88	84	84⅓	Wind southwest morning; very light east until 3 P. M.; southwest till night; shower at 2 P. M.
22	76	83	80	79⅔	Wind southwest morning; rain from 3 A. M. till 10 A. M.; rain at 2 P. M.; wind 3 P. M., northwest till night; showery at dark.
23	80	88	83	83⅔	Wind light southwest all day; rain in morning; evening clear.
24	81	90	84	85	Wind light southwest in morning; light southeast evening; rain in morning; evening clear and very warm.
25	81	90	84	85	Wind southwest all day; clear.
26	82	87	80	83	Wind southwest morning and evening until 5 P. M., then north; rain 4 P. M.; 7 P. M. wind southwest.
27	80	87	82	83	Wind southwest all day; clear.
28	81	90	86	85⅓	Wind southwest all day; clear; 2½ P. M. mercury 95° shade; clear.
29	80	90	86	85⅓	Morning calm; southwest rest of day; 11 A. M. mercury 98° shade; clear.
30	80	94	84	86	Wind southwest all day, and light; clear.
31	80	94	83	85⅔	Wind southwest until 10½ A. M., then west till 12 M., then southwest rest of the day; clear.

General Remarks.—Weather very warm, and winds light.

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Meteorological Report for the month of August, 1868, recorded at Lavacca, Calhoun County, Texas.

Day.	Temp. at 8 A. M.	Temp. at 12 M.	Temp at 7 P. M.	Mean temp.	Remarks.
1	83	95	84	87⅓	Wind southwest all day; clear.
2	82	96	86	88	" " " "
3	82	98	84	88	Southwest till 2 P. M.; north till 4 P. M.; east rest of day; evening cloudy.
4	76	86	80	80⅔	North till 9 A. M.; rain 2 P. M.; wind east of day, and clear.
5	76	83	81	80	North till 9 A. M.; east rest of day; cloudy.
6	80	92	83	85	Southwest and light in morning; east evening; clear.
7	82	94	84	86⅔	" all day; clear.
8	80	97	82	86⅓	" " "
9	80	96	82	86	" " "
10	80	94	84	86	" " "
11	81	96	84	87	" " "
12	82	94	86	84	" " " calm in morning.
13	84	96	85	88⅓	Southeast " "
14	81	100	84	88⅓	Light southwest till 12 M.; east rest of the day; clear. Mercury at 100° from 11 A. M. until 1 P. M.
15	82	94	86	87⅓	Southeast all day; light in the morning; clear.
16	84	92	87	87⅔	" " " " " "
17	83	94	84	87	Southwest till 10 A. M., then east till night; clear.
18	83	98	84	88⅓	Southeast all day; clear, except shower in morning.
19	84	98	85	89	East all day; rain from 10½ P. M. till morning; morning clear; evening cloudy.
20	76	86	82	81⅓	East all day; clear.
21	82	93	79	84⅔	North till 10 A. M.; east till 1 P. M.; northeast rest of the day; morning and evening cloudy.
22	82	81	82	81⅔	North morning; east evening; showery from 11 A. M. till 12; cloudy.
23	82	92	76	83⅓	East morning; 3 P. M. high east wind and rain till dark.
24	80	88	84	84	East all day; cloudy.
25	82	86	80	82⅔	" " " Rain all the morning.
26	78	83	81	80⅔	Northeast morning and rain; east evening, and cloudy, but no rain.
27	79	84	81	81⅓	Southeast morning and evening; rain in morning; evening cloudy, but no rain.
28	79	85	81	85	Southeast morning; southwest till 3 P. M., then east till night; evening cloudy.
29	82	84	79	81⅔	Southeast all day; cloudy.
30	80	92	80	84	" " clear.
31	81	92	83	85⅓	" " "

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Meteorological Report for the month of September, 1868, recorded at Lavacca, Calhoun County, Texas.

Day.	Temp. at 8 A.M.	Temp. at 12 M.	Temp. at 7 P.M.	Mean temp.	Remarks.
1	82	86	80	82⅔	Wind southeast morning; shower 10 A. M.; north all the evening; cloudy.
2	77	80	78	78⅔	Northwest and rain from 4 A.M. till 11 A.M.; north all the evening; cloudy.
3	77	86	80	81	Morning calm and cloudy; southeast evening, and clear.
4	77	89	81	82⅓	Southeast all day; rain 4 P. M.
5	80	87	82	83	Light north morning till 10 A. M.; east rest of the day; clear.
6	80	87	83	83⅓	East all day; cloudy morning, and showery southeast all day; evening clear.
7	81	86	80	82⅓	Southeast all day; heavy thunder 11 A. M.; evening calm.
8	81	94	83	86	Morning calm till 11 o'clock, then light west till night—clear.
9	80	93	82	85	West all day; clear.
10	83	92	83	86	Southwest all day; clear.
11	82	94	83	86⅓	" " "
12	83	92	83	86	Southeast " "
13	82	94	82	86	North morning and night; southeast rest of day.
14	81	86	82	83	Southeast morning; 2 P. M. north and showery; 4 southeast, heavy.
15	82	91	82	85	Showery 2 A. M.; light west morning; southeast evening; clear and cool.
16	78	86	78	80⅔	North morning, and rainy; southeast till 2 P. M., then north; cloudy.[1]
17	71	72	73	72	Norther continued all day; cloudy.
18	72	83	78	77⅔	Norther until 10½ A. M.; Rain 11 A. M.; east till dark; evening clear, with rain at night.
19	79	90	80	83	Southeast all day; cloudy and clear at intervals.
20	80	88	80	82⅔	" " " " " "
21	83	86	82	83⅔	" " clear.
22	80	93	84	85⅔	Southwest " "
23	66	72	72	70	Norther at 2 A. M., and rain for one hour; cloudy all day.
24	66	73	79	72⅔	Rain in the morning; norther until 4 P. M.; evening clear and calm after norther; 10 P.M. norther again, but no rain.
25	64	74	73	70⅓	Norther all day; clear.
26	67	78	74	73	Norther until 10 A. M.; east rest of the day; clear.
27	70	86	80	78⅔	Southeast all day; clear.
28	72	86	77	79⅓	" " "
29	73	79	78	76⅔	Southeast all day; commenced raining 2 A. M.; continued all day.
30	74	77	76	75⅔	Rain all night; southeast all day; cloudy all day.

[1] First norther of the season. Quite cool, and continued until 10½ A. M. of the 18th.

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Meteorological Record for the month of October, 1868, recorded at Lavacca, Calhoun County, Texas.

Day.	Temp. at 8 A.M.	Temp. at 12 M.	Temp. at 7 P.M.	Mean temp.	Remarks.
1	74	74	73	73⅔	Wind northeast morning; rain all day and nearly all night; 3 P. M. norther and high wind.[1]
2	71	77	77	75	Norther; changeable sky.
3	71	78	76	75	Southeast all day; clear.
4	71	86	77	78	Light southeast all day; clear.
5	70	82	77	76⅓	" " " "
6	76	80	78	78	" " " "
7	76	86	79	80⅔	" " until 8 P. M.; norther; clear.
8	58	66	64	62⅔	Norther until 9½ P. M.; clear.
9	56	78	68	67⅓	Southeast till 2 P. M.; norther until 4 o'clock, then clear and calm; 53° half hour after sunrise; coldest day yet.
10	62	77	71	70	Light norther until 11 A. M.; east rest of the day; clear.
11	64	88	74	75⅓	Light norther until 12 M.; south till dark; clear.
12	72	85	76	77⅔	Light norther until 10 A. M.; east rest of the day; clear.
13	75	88	78	77⅔	Dense fog in early morning; east all day; clear.
14	75	88	80	81	" " " " " "
15	74	83	82	79⅔	East all day; clear.
16	78	83	78	79⅔	" " "
17	78	84	79	80⅓	" " " Wind light in the evening.
18	78	80	78	78⅔	Heavy east all day; sky changeable.
19	76	78	79	77⅔	East all day; rain till 2 P. M.; rest of the day clear.
20	76	82	78	78⅔	Norther and rain till 9 A. M.; east rest of the day.
21	65	66	65	65⅓	North all day; clear.
22	58	68	66	64	Norther continued till sunset; east rest of the day; clear.
23	58	68	66	64	North morning till 10 o'clock; east rest of the day; clear.
24	58	72	68	66	East all day; light in the evening, clear.
25	66	82	71	73	" " clear.[2]
26	68	73	72	71	" " cloudy.
27	70	75	70	71⅔	" morning; 2½ P. M. norther and rain till dark.
28	68	81	72	73⅓	North till 12 M.; then east till dark; clear.
29	70	77	71	72⅔	East all day; changeable.
30	72	80	78	76⅔	Fog and raining morning; north 11 o'clock; light east evening; calm at dark; clear.
31	63	66	63	64	Calm all last night; norther to-day till dark, then calm rest of evening; evening clear.

[1] The weather to-day could well be taken as the equinoctial storm.

[2] Wind has generally lulled this week at dark, and nights have been quite calm and clear. Hereafter (31) the degrees for the evening will be put down at sunset, or 5 o'clock, instead of 7 as heretofore.

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Meteorological Report for the month of November, 1868, recorded at Lavacca, Calhoun County, Texas.

Day.	Temp. at 8 A.M.	Temp. at 12 M.	Temp. at 5 P.M.	Mean temp.	Remarks.
1	56	64	62	60⅔	Light north wind all day; clear.
2	56	70	68	64⅔	" east " "
3	64	71	68	67⅔	Calm morning; light east rest of the day; clear.
4	68	88	76	77⅓	Very light east morning; southwest evening; clear.
5	63	78	74	71⅔	Light east all day; clear.
6	68	79	77	74⅔	" " "
7	76	82	76	78	Southwest all day; shower at 2 P. M; rest of day clear.
8	76	80	74	73⅓	Southwest all morning; southeast evening; changeable in the evening, and showers.
9	76	78	77	77	Southwest all day; 8 P. M. norther; cloudy and showers.
10	50	61	58	56⅓	Norther continued all day; clear.
11	50	66	63	59⅔	Norther until 12 M.; southeast rest of the day; clear.
12	51	67	64	60⅔	First frost of the season; southeast all day; clear.
13	62	69	66	65⅔	Southeast all day; morning cloudy; evening clear.
14	64	80	69	71	" " clear.
15	68	76	78	74	Rain 1 A. M.; southeast during the day; cloudy; 7 P. M. hard rain, which continued till morning of 16th.
16	56	62	56	58	Rain during the night; norther all day; cloudy.
17	44	77	58	59⅔	Norther continued all day; mild in the evening; clear.
18	53	58	56	55⅔	Light southeast till 12 M., then calm till 2 P. M.; light southeast rest of the day; clear.
19	56	61	60	59	Light southeast all day; morning clear; evening cloudy.
20	50	60	59	56⅓	Morning calm; northeast 2 P. M. and rest of the day; clear.
21	45	77	54	55⅓	Norther all day; clear.
22	48	59	53	53⅓	Norther in morning till 10 A. M.; east rest of the day; cloudy and showery in the evening.
23	50	54	60	54⅔	Heavy east all day and last night, with rain.
24	60	59	55	58	Rain continued all day; wind light north morning and evening.
25	52	70	62	61⅓	Light north all day; clear.
26	52	61	60	57⅔	Very light east all day; clear.
27	52	49	49	50	Northeast, and short rains in morning, and 12 M. short time; norther rest of the day; cloudy.
28	44	60	58	50⅔	Light northeast all day; clear.
29	43	78	65	62	Very light east " "
30	58	78	68	68	Calm, clear day.

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Meteorological Report for the month of December, 1868, recorded at Lavacca, Calhoun County, Texas.

Day.	Temp at 8 A.M.	Temp. at 12 M.	Temp at 5 P.M.	Mean temp.	Remarks.
1	58	70	63	63⅔	Light wind, east all day; clear.
2	59	64	62	61⅓	Heavy east all day; rain 2 P. M. and rest of the day.
3	60	68	62	63⅓	Rain all last night; east all day; cloudy.
4	54	63	60	55⅔	Light east all day; clear.
5	56	72	66	64⅓	Morning calm till 10 A. M.; east rest of the day; clear.
6	45	74	52	53⅔	North all day; clear.
7	40	51	52	47⅓	Norther continued all day; clear.
8	41	52	50	47⅔	Light norther " "
9	50	47	48	48⅓	Rain and norther "
10	39	44	45	42⅔	Norther all day and cloudy; sunset clear.
11	28	40	40	36	" " clear; coldest day of the season.
12	39	50	52	47	Cold east all day, and cloudy; 4 P. M. rain, and continued all night.
13	34	54	42	43⅓	Norther and rain all day.
14	34	40	40	38	" " "
15	49	55	54	52⅔	Northwest till 4 P. M., then calm till dark; morning showery; evening clear.
16	43	68	60	57	Southeast all day; clear.
17	45	73	62	60	Calm till 10 A. M.; southwest rest of day; clear.
18	52	71	62	61⅔	Southwest all day; clear.
19	61	70	62	64⅓	Fog till 10 A. M.; 12 M. showery; southwest all day; evening foggy.
20	62	65	72	66⅓	Fog till 12 M.; light breeze 2 P. M.; rest of the day calm.
21	59	60	60	59⅔	Morning calm and foggy; east rest of the day; cloudy.
22	59	61	58	59⅓	Foggy all day; east all day; cloudy.
23	38	42	44	41⅓	Heavy east till 12 M. (night); North all day; morning cloudy; evening clear.
24	30	54	40	41⅓	Norther all day; clear.
25	32	58	50	46⅔	" till 10 A. M.; light east till dark; cloudy.
26	49	69	56	58	Southwest till 2 P. M.; cold east and light fog rest of the day; otherwise clear.
27	53	60	54	55⅔	Foggy all day; light southeast all day; cloudy.
28	56	60	60	58⅔	" " " " " "
29	56	64	61	60⅓	Foggy all day, and misty rain; rain during last night; cloudy.
30	60	55	54	56⅓	Foggy till 12 M.; rain till midnight; southwest morning till 11 o'clock, then norther; sunset clear.
31	48	68	66	60⅔	Southwest till 4 P. M., then calm; clear.

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Meteorological Report for the month of January, 1869, recorded at Lavacca, Calhoun County, Texas.

Day.	Temp. at 8 A.M.	Temp. at 12 M.	Temp. at 6 P.M.	Mean temp.	Remarks.
1	54	78	68	66⅔	Morning calm 10 A. M.; southeast rest of the day; clear.
2	60	64	62	62	Foggy all day; calm all day.
3	60	69	68	65⅔	Foggy and calm until 12 M.; southwest rest of the day; cloudy.
4	66	71	66	67⅔	Foggy and calm until 9 A. M., then northwest till 3 P. M.; northeast till dark; clear otherwise than fog in morning.
5	48	62	58	56	Norther last night, and continued all day; clear.
6	50	64	61	58⅓	East all day; clear.
7	60	65	65	63⅓	East all day; morning misty, rain continued all day; cloudy.
8	65	70	69	64⅔	Morning foggy; light east till 12 M., then northeast till dark; cloudy.
9	46	54	55	51⅔	Norther all last night and until 12 M. to-day; east rest of the day; clear.
10	40	54	51	48⅓	Norther all last night and to-day; rain in the morning; evening clear.
11	36	62	54	50⅔	Light east all day; clear.
12	48	66	58	57⅓	Morning calm and clear, with mirage; evening cloudy; light east all day.
13	58	66	60	61⅓	East all day; 2 P. M. rainy and misty; cloudy.
14	64	56	59	59⅔	Rain from 7 o'clock last night till 7 A. M. to-day; East till 11 A. M., then west till 2 P. M.; north rest of day; cloudy.
15	50	53	63	55⅓	North in morning; northwest 2 P. M.; clear.
16	51	54	54	53	Morning clear till 11½ o'clock, then rain till 2½ P.M., with east wind, then north rest of the day; cloudy.
17	50	48	54	50⅔	Raining nearly all day, with east wind.
18	41	54	53	49⅓	Norther all day; clear.
19	44	48	47	46⅓	" " and rain.
20	43	44	44	43⅔	Rain and storm all day; north morning; northeast evening; cloudy.
21	46	50	52	49⅓	Morning foggy; northeast all day; cloudy.
22	48	53	51	50⅔	Northeast all day; cloudy.
23	48	52	54	51⅓	Northeast morning; evening calm; cloudy but no rain.
24	50	68	64	60⅔	West all day; clear as crystal.
25	49	65	58	57⅓	Light east all day; morning calm; clear all day.
26	55	62	60	59	East " " " "
27	55	78	63	65⅓	East morning; 12 M. west; 3 P. M. east; clear with the exception of fog in the evening.
28	60	70	65	65	West morning; east rest of the day; sky changeable.
29	50	65	59	58	Northwest morning; 10 A. M. north; 1 P. M. east rest of the day; clear.
30	47	57	56	53⅓	Northeast all day; clear.
31	52	58	58	56	Strong southeast all day; morning cloudy; evening clear.

General Remarks.—Amount of rain from the 12th 3.4 inches. Partial eclipse of the moon on the 27th at 6½ o'clock P. M.; visible only a few minutes on account of fog.

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Partial Meteorological Report for the month of February, 1869, recorded at Lavacca, Calhoun County, Texas.

Day.	Temp. at 8 A.M.	Temp. at 12 M.	Temp. at 5 P.M.	Mean temp.	Remarks.
1	56	66	69	62⅔	Rain till 8 A. M. 0.4 inch; northeast morning; northwest 1 P. M. and rest of the day; morning cloudy; evening clear.
2	47	62	58	55⅔	Northwest all day; clear.
3	43	62	56	53⅔	" " "
4	38	52	49	47⅓	Northeast all day; hazy.
5	46	51	51	47⅓	East all day; cloudy.
6	52	56	55	54⅓	" and rainy all day.
7	59	58	60	59	Morning calm and rain till 7½ A. M.; rain 2 P. M.; east rest of the day; foggy all day; 0.8 in. rain.
8	64	65	66	65	Northeast, and rain and fog till 5 P. M.; northeast night; sunset clear; 0.7 inch rain.
9	54	72	71	65⅔	Light northwest all day; clear.
10	54	68	64	62	East all day; clear.
11	60	67	63	63⅓	East all day; morning clear, and evening cloudy; Rain at 8 P. M. until
12	62	64	64	63⅓	Storm continued and rain till 10 A. M.; east and stormy all day; cloudy; 0.5 inch rain.
13	64	66	63	64	Light west till 10½ A. M.; southeast with rain and fog rest of the day; 3 P. M. north rest of day; cloudy; 0.3 inch rain.

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REPORT

ON THE

EPIDEMICS OF CALIFORNIA IN 1868.

BY

F. W. HATCH, M.D.,

SACRAMENTO, CAL.

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REPORT ON THE EPIDEMICS OF CALIFORNIA IN 1868.

THE past year is one which will long be remembered by the profession in California as one of unusual epidemic prevalence.

In other years, indeed, this influence has been felt, and the records of the past bear witness to several visitations of a more or less fatal character. At no previous period, however, since the occupation and settlement of the State by its present inhabitants, has the epidemic character of disease been so well marked, or manifested itself in a manner so positive and yet so varied as during the twelve months just past.

Upon the special causes operating to bring about this result, the meteorological or other phenomena to which the morbific influences have been due, we shall not attempt to speculate. To this end the medical world has taxed its ingenuity through long ages, from the days of Hippocrates to the present time, and while many ingenious theories have been advanced and many valuable truths elicited, who can say with certainty that we are to-day more advanced in positive knowledge demonstrative of the epidemic influence and its causes than when Hippocrates himself wrote?

Even the physical conditions which surround us, atmospheric, telluric, lunar, or sidereal, which have been made the subject of many speculative studies, and for the elucidation of which so many observations have been made, are not so well understood as to enable us to pronounce with a satisfactory degree of assurance that any particular modification or unusual occurrence therein has the slightest direct causative connection with the origin or periodical return of disease. And yet, it is not without some show of reason that the phenomena which have been exhibited in the heavenly bodies, and the convulsions of the earth witnessed during the past year along the Pacific Coast, have been referred to by some as having a more or less intimate relation to the epidemic diseases which have prevailed. The subject is one of conjecture merely,

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and is alluded to only in deference to opinions which have been recently advanced in the attempt to explain on theoretical grounds the morbific effects observed.

We pass, then, from that which is simply hypothetical to the medical phenomena which have been apparent.

The subjects which particularly interest us involve the history of several more or less prevalent diseases running on from the commencement of the year in January, 1868, to the present time—pneumonia, whooping-cough, measles, and smallpox. There seems to have been throughout a marked predisposition to inflammatory disease, especially of the pulmonary organs and the mucous and cutaneous surfaces. This disposition was manifested early in the season by the frequency of bronchitis and pneumonia among children; parotitis, sore-throats—sometimes diphtheritic—and a few cases of scarlatina. The latter never rose, however, to the prominence of an epidemic. About the same time hooping-cough made its appearance, spreading epidemically, affecting almost all the children who were not protected by a previous attack, and complicated in very many cases by severe and even fatal pneumonia and bronchitis. Later on, towards the last of April, measles was added to our catalogue of diseases, this and hooping-cough often occurring together in the same patient, adding very materially to the risk of life and the hazard of pulmonary complication.

The first death occurring in Sacramento from measles was reported early in June, though the epidemic itself may be stated to have commenced earlier, or towards the last of April. Occasional cases were observed from this time on during May, rapidly increasing towards the last of the month, when its epidemic character was fully recognized.

It is impossible to arrive at anything like a correct idea of the extent or fatality of the disease, except from the records of mortality; and even these are so imperfect as scarcely to be relied upon for the purpose. The misfortune is, that most of the deaths from this disease are assigned to the secondary accidents rather than to that which was primary and really the efficient cause. Thus, we find on the record only five deaths attributed to measles in June, three in July, and one in August, at the very time when the disease was raging in its most violent form. It will be observed, however, by the statistics to be cited, that in June and July, the deaths from causes commonly complicating measles, as pneumonia,

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congestion of the lungs, meningitis, and convulsions, among children under twelve years of age, had risen from *one* for the lung complications, and *three* for those of the brain and nervous system in 1867, to twenty-one for the former, and twenty-four for the latter, in 1868. Add these, as may without much injustice be done, to the deaths assigned to measles, and we have a total mortality during the two months, more or less directly due to the influence of the epidemic, of fifty-four. It will be further shown by the table of mortality for June, July, and August, for 1868, as compared with that for the same months in 1867, that the infant mortality (under twelve years) was increased from *seven* in June, *seven* in July, and *five* in August, to *thirty-seven*, *thirty*, and *eighteen* respectively. Perhaps no better or more correct idea could be conveyed of the real extent of the disease and its fatality than by the above statement.

			Children under 12 years, 1867.			Children under 12 years, 1868.			1867.	1868.
	1867.	1868.	Pulmonary organs.	Brain.	Convulsions.	Pulmonary organs.	Brain.	Convulsions.	Mortality under 12 years.	Mortality under 12 years.
Jany.	25.	34.								
Feby.	21.	25.								
March.	28.	21.								
April.	28.	22.								
May.	27.	27.							7	37
June.	24.	56.	0	0	1	8	6	7	7	30
July.	20.	58.	1	0	2	13	3	8	5	18
August.	20.	40.								
Total.	193.	283.								

By the above it will be seen at a glance how very materially the mortality for the past year, especially during the greatest prevalence of measles—June, July, and August—exceeded that for the same months in the previous year. This was due, in part, to the measles *per se*, and partly, as has been shown, to the complications existing, and the other epidemic diseases with which it was associated.

Of the particular character of the disease, as it presented itself in this locality, much might be said. Essentially, it was adynamic; attended frequently with feebleness of the pulse, absence of much heat, or even a coldness of the external surface, and presenting great variations in the extent, course, and precise kind of eruption. Indeed, so frequently were anomalies presented in this latter fea-

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ture, that a diversity of opinion has existed among our medical men as to its true nomenclature. Irregularities were noticeable in all the stages, more especially in the period of eruption and its duration. Sometimes, in cases under the care of the writer, the eruption came on during the fifth or sixth day of fever; in one case, as late as the ninth. There was not much uniformity as to the part of the surface upon which it was first discoverable, though it frequently appeared upon the trunk, the chest, or back by preference, gradually extending over the entire body. A sense of itching was almost universal, as was also sore-throat, in addition to the other premonitory symptoms. The appearance of the rash varied. In some cases it was almost uniform, assimilating scarlatina; in others, strictly characteristic of measles; in others again, presenting various shades of difference from either of these, or rather, of similarity to both. Its duration varied from four or five to even eight or ten days; occasionally it was more transient, passing off in twelve to twenty-four hours. When well developed, it generally terminated in desquamation. In one case, that of a little boy about three years of age, after a day or two of *malaise*, fretfulness, slight feverishness, and coryza, the eruption appeared upon the trunk simultaneously with severe convulsions; then disappeared, to show itself again on the fifth day, continuing to the eleventh. The efflorescence in this instance was confluent over the greater part of the body, presenting an almost uniform redness, distinctly elevated. Convulsions were not infrequent at the commencement. Of seventy-five cases, of which special notes were taken, eight commenced in this manner, seven simultaneously with the eruption, and one on the second day of fever. Dropsy occurred as a sequel in two cases.

We are indebted to Drs. Cluness, Simmons, and Oatman, of this city, for a record of their cases during this epidemic. Adding those reported by these gentlemen to those occurring in the practice of the writer, we have an aggregate of 568 cases of the disease. Of these, 312 were children under five years of age; 213 over five and under twelve; and 43 estimated in general terms to have been under twelve years. Of this number, 57 were reported to have been complicated by pertussis, 43 by pulmonary inflammation—pneumonia or capillary bronchitis; 16 by brain disease; 19 by convulsions; two by croup; and one, which was seen in consultation by Drs. Cluness, Simmons, and myself, by well defined and fatal trismus. Diarrhœa, mucous or bloody, was also a not uncommon and sometimes troublesome complication.

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Record of Cases of Measles.

Months. 1868.	Number of cases.	Ages.			Complications.					Result.	
		Under 5 years.	5 to 12.	Under 12 additional.	Lungs.	Brain.	Convulsions.	Pertussis.	Dropsy.	Recovered.	Died.
April to Aug.	568.	312.	213.	43.	43.	16.	19.	57.	6.	530.	38.

By the "table" we find that, of the 568 cases, 10 per cent. were complicated with hooping-cough; 7 per cent. with pulmonary trouble; 2 per cent. with actual cerebral inflammation; and 3 per cent. with convulsions. This result is somewhat more favorable than that derived from the experience of the writer taken singly. Of the 75 cases above alluded to, 14 presented well-marked pneumonic symptoms, or 18 per cent. It is proper to remark, that 9 of these were affected by pertussis; and it was generally remarked by all observers, that the fatality of the epidemic was in great measure dependent upon its association with this disease. Twenty of the 75 cases had hooping-cough, or 26 per cent.

Referring to the table of 568 cases, we find the mortality to be about 6 per cent.; of the writer's own 75 cases, taken separately, it was 8 per cent.

It has been stated that the disease was essentially adynamic in its type. Except in the mildest form, in which the treatment was simply expectant, stimulants were needed early in the disease, being indicated by a feeble pulse, absence of much heat of the skin, a pale or deficient eruption, or, on the other hand, as in violent cases, purple or livid, with imperfect capillary circulation and decided coldness of the extremities, with tendency to exhaustion of the vital forces. In one case, that of a lad some seventeen years of age, living near the city, in a highly malarious district, the eruption assumed the form of a distinct hemorrhagic purpura, proving fatal in about twelve hours from the appearance of the rash.

Among the agents used to counteract the debility and maintain the strength, nothing seemed more beneficial than egg-nog, beef-tea, and quinine; in some cases these were alternated with chlorine-water and tinct. ferri chloridi. Even in the pneumonic complications, moderate and sometimes very liberal stimulation proved decidedly advantageous. In that form of the complaint associated

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with hooping-cough, as in the latter when uncomplicated, the bromide of potassium or of ammonium was used with good effect.

Of the extent of the disease in other localities, except San Francisco, we have no reliable record. That it prevailed extensively throughout the State is, however, a matter of history. Accounts from all sections, published at the time, told of its ravages among the infant and juvenile population. From San Francisco we have the statistics published in the *Pacific Medical and Surgical Journal*, Feb. 1869; and here, too, as in Sacramento, we find it to have been preceded and accompanied by pertussis. In fact, the exanthematous diseases generally are stated to have been more than usually prevalent.

The first deaths reported from measles in San Francisco were in April, viz., 4; increasing to 12 in July, and diminishing again to 2 in December; the total reported mortality being 45. From hooping-cough the entire mortality is said to have been 58, or 3 in January, 3 in March, 6 in April, 2 in May, 4 in June, 7 in July, 5 in August, 7 in September, 5 in October, 11 in November, and 5 in December.

Probably the explanation made when speaking of the record of deaths from these diseases in Sacramento will apply equally as well to San Francisco, and many cases due to measles and hooping-cough as the primary cause have been set down under that which is secondary and more immediate. This is, indeed, the more probable from the fact that the mortality among children under ten years of age rose from 1052 in 1867 to 1599 in 1868. Dr. Gibbons, Jr., in summing up the record for the year, says: "It will be seen that most of this excessive mortality comes under the head of miasmatic diseases, which includes 1107 deaths, or nearly two-thirds of the entire number. This is over three times as many as occurred in 1867, and is not by any means due entirely to smallpox, as the mortality from each of the diseases mentioned in the *order* was greater in 1868 than in 1867. The exanthemata, in particular, have been very prevalent and fatal, perhaps more so than at any time in the history of our city." . . . . "Another noticeable fact," he adds, "is the large mortality from hooping-cough."

Following closely upon the epidemic diseases whose history we have imperfectly related came smallpox, particularly interesting at this time, as having been more generally diffused and violent in its character than any which has heretofore visited the Pacific coast. Smallpox, whensoever it may occur in a community, is apt to occasion alarm, but never before has the public mind been so much

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excited in our midst as by the epidemic which for the last nine or ten months has been doing its deadly work in different sections of the State, and which is even now prevailing to a very considerable extent in some of our principal cities. So rapidly fatal has it been in some instances, and so unusual the particular phase presented to the unprofessional public, that various titles significant of terror and fatality have been assigned to it, as "black measles," "black smallpox," "China smallpox," etc. The latter term seems peculiarly inappropriate, as, so far as we have been informed, our Chinese population in Sacramento, as well as in San Francisco and along the line of the great Pacific Railroad, have been unexceptionably exempt from attack. This fact is the more remarkable, as, from their filthy habits, their mode of living, crowded together in close and ill-ventilated houses, and from the occupation pursued by so many—that of washing for the people of the principal cities where the disease is most prevalent—they would be supposed to be especially liable to contagion. From inquiries made by my son, Dr. T. B. Hatch, surgeon of one of the steamships running between San Francisco and China, it has been ascertained that inoculation is very generally practised in that country. Many of those who come here have been subjected to that process. They also vaccinate after our own fashion, and apply the virus to the mucous membrane of the nose as *snuff*. Whatever virtue there may be in their peculiar methods of operating, the fact of their almost universal exemption in this country is certain.

Since the possession and occupation of California by the United States, three distinct epidemics of smallpox have occurred in the valley of the Sacramento and elsewhere. The first, following the tide of immigration then rapidly flowing in across the ocean, commenced in 1852. It was a period in our history when many causes conspired to render the transient population of the cities peculiarly susceptible to the spread of epidemic disease. Society was as yet unsettled. It was made up of adventurers in search of sudden wealth, most of them strangers to each other, brought together from every section of the country, without the comforts to which they had been accustomed, and exposed to hardships, and many of them to privations, for which they were but ill prepared. In this state of society the observance of any salutary hygienic rules was out of the question. Of this epidemic, Dr. Harkness, at that time occupying the position of City Physician, says that of 285 cases occurring and treated both in the hospital tent and in private

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dwellings, there were thirty-five deaths, or one in eight; while of those treated in the hospital alone the mortality was only one in twelve, or about eight per cent.

Passing over the cholera of 1852, and several subsequent minor outbreaks of scarlatina, hooping-cough, and diphtheria, which, as our juvenile population augmented, became occasional visitants among us, we come down to the smallpox of the year just past. At no former period in our history has this disease prevailed to so great an extent or with such fatality as at this time. Other epidemics of the same affection have been comparatively mild in character and limited in their infectious power. Of that of 1852–3, it has been shown that, while the social condition, the general absence of suitable hygienic precautions, and the reckless habits of a certain portion of the population were such as to favor the spread of contagious disease, the mortality of the epidemic under hospital treatment was only one in twelve. This, too, was at a time when a large portion of our citizens were rendered houseless and homeless by the devastating fire which in a single night swept over our city and left it desolate.

Later, in 1861–2, simultaneously with another great calamity which befell the city of Sacramento and surrounding valley—the great flood—this loathsome disease again made its appearance among us. Notwithstanding the want of comforts to which many were subjected during a time of general distress, only 104 cases are known to have occurred, and four deaths, one of these being an unvaccinated nursing infant. Vaccination, wherever practised, appeared to afford complete exemption. In this connection the Board of Health, in their annual report, remarked "that the efficacy of vaccination, even after exposure to contagion, has received additional testimony from the experience of this brief epidemic;" and they cite a case in support of their assertion reported by one of their number, "of an entire family of five persons, father, mother, and three children, one of whom had a severe form of distinct smallpox, occupying together the same bed, and of whom none had ever been previously vaccinated," in which the conservative virtue of this precious agent was fully tested.

The present epidemic has assumed a different character, bidding defiance for a time to the ordinary hygienic precautions and affecting to a greater extent than we had any reason to anticipate, those who were supposed to have been protected by previous vaccination.

The first case reported in Sacramento was in June, 1868, in the

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person of a man who had but recently arrived here from San Francisco, where he undoubtedly contracted the disease. It was a simple case of varioloid. The patient had been vaccinated in childhood, and exhibited upon his arm the well-known cicatrix. A few days later, a youth, also recently arrived from a visit to San Francisco, was stricken down by the disease. Both of these were treated in a tent erected for this purpose near the city, yet well isolated from society, and both recovered. The third case originated in this city shortly after the recovery of the patients first affected, or about September 16th, the contagion having been received from the tent in which the first two patients had been domiciled during their sickness, and which was said to have been stolen by the subject of this case and carried to his home. It was confluent and fatal. We have not been able to ascertain whether he had been vaccinated. The presumption is that he had not.

From this date the epidemic may be said to have commenced in this city. It has not been without some degree of interest that we have traced the gradual dissemination of the disease from this case. If any additional fact were needed to demonstrate its communicability, it would seem that it was supplied by the brief history of the origin of this epidemic. A man having stolen the tent used for smallpox patients was attacked by the disease, and, after being moved to another tent provided for the purpose in the same locality, died. The undertaker, who buried him; the brother of the undertaker, who was exposed through the latter; and several children, who, seeing the strange spectacle of a funeral in the out-of-the-way neighborhood of the tent, ran off to see it pass, and afterwards are said to have amused themselves by playing in the tent from which the dead man had just been taken, followed each other in close succession. Such was the origin of the epidemic in Sacramento. From these children it spread to others, until, in October, in addition to a number of cases in the city, the hospital contained eight patients. In November the number of admissions to that institution had increased to ten; in December, to fourteen; until at length in February and March the disease seemed to have reached its height.

Below we add a statistical view of the epidemic from its commencement in September, 1868, to the close of our report March 23d, 1869.

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Smallpox treated in the Hospital.

Months.	Cases.	Recovered.	Died.	Vaccinated.	Not vaccinated.	Confluent.	Discrete.	Varioloid.	Malignant.
1868.									
July.	2	2		2				2	
Aug.									
Sept.	1		1		1	1			
Oct.	9	5	4	5	4	4	1	4	
Nov.	10	7	3	6	4	4	2	4	

Months.	Cases.	Recovered.	Died.	Vaccinated.	Not vaccinated.	Confluent.	Discrete.	Varioloid.	Malignant.	Under treatment.
1868.										
Dec.	13	7	6	8	5	8	1	3		
1869.										
Jan.	8	7	1	6	2	3	6	2		
Feb.	23	15	7	16	7	4	6	8	2	
March.[1]	12	9	2	8	4	1	3	6	2	2
Total.	78	52	24	51	27	25	19	30	4	2

It will be seen that up to the 23d of March, 1869, there had been 78 cases of the disease in the hospital, and of these, 2 are still under treatment; of the 76 cases remaining, 24 died, or 31 per cent.—nearly one in $3\frac{2}{10}$. Of the entire number, 51 had been vaccinated, or 65 per cent. Of the vaccinated, so far as at present definitely ascertained, 3 died, in one of whom the disease was complicated with a long-standing cardiac affection. The proportion of deaths among the vaccinated was, therefore, one in seventeen—about 6 per cent.; a proportion greater than has generally been admitted to be true of other epidemics.

Of the confluent cases stated to have been 25 in number, we find by the hospital record 16 deaths, or 64 per cent.—about one in $1\frac{5}{10}$. Aitken states the deaths from natural smallpox to average one in three.

Of the cases registered as both confluent and discrete we observe the deaths to have been twenty-one.

Of the disease as it occurred and was treated in private families, our report must necessarily be somewhat imperfect, in consequence of a few cases having, doubtless, escaped the vigilance of the health officer. It is believed, however, that they are not sufficient in number materially to affect the reliability of the statistics. The whole number of these cases reported as having been treated at home up to March 23d, 1869, was eighty-four.

The following tabular statement will exhibit the special features of the disease:—

[1] To 23d instant.

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Cases privately treated.

October to March 23.	Form of disease.				Recovered.	Died.
	Confluent.	Discrete.	Varioloid.	Unascertained		
87.	22.	28.	17.	20.	54.	30.

It will be seen that, so far as ascertained, the number of cases privately treated is slightly in excess of those taken to the hospital. Probably a few cases escaped notice, but, as before observed, not enough to affect the general reliability of the statistics. We have been unable to detail the cases by months, as in many instances it was impossible to arrive at the facts with accuracy. In general, however, it may be stated that they coincide in this respect with the observations cited from the hospital record. The relation of these cases to vaccination is satisfactory, and fully sustains the utility of the process primarily and the necessity of revaccination. By inquiry of the medical friends of whom the report of private cases has been obtained, it is shown that the confluent cases were in persons who presented no mark of vaccination upon their arms; that among the vaccinated only two deaths occurred, and those among young children who were only vaccinated after direct exposure; and that of the entire number there was no evidence that a single case had been revaccinated, except, indeed, as in the other cases, it was done after exposure to the disease, and too late for the effectual action of the prophylactic.

Of the entire number reported under this head (87) thirty deaths are accounted for, or 33 per cent., being one in $2\frac{9}{10}$. Thus it will be seen that the deaths among private patients have compared with those at the hospital, as 30 per cent. for the latter to 33 per cent. in the former; a fact due, possibly, in some measure, to the more exact hygienic regulations of the public institution, but also to the fact, that among those treated in private are reckoned twelve young children, two of them nursing infants. The total cases of smallpox, then, in both the city and hospital, have been, to March 23d, 165; total confluent cases, 47; discrete 47; varioloid 47; malignant 4; unascertained 20.

The ratio of deaths to cases, taking all together, has been 32 per cent., or one in three, a large proportion, including, as it does, 68 cases of what are set down as varioloid. We will allude to this subject again, when we come to refer to vaccination and its results.

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As compared with the total mortality during the prevalence of smallpox, the deaths from the epidemic influence have been 22 per cent., or one in forty-five; the total mortality from all causes, from Sept. 21, 1868, to the close of our report, March 23d, 1869, being 246.

The general character of the disease, as it has manifested itself in this city, has been decidedly asthenic. This feature has been remarked by nearly all who have been called upon to treat it. It has exhibited itself in the form of the eruption, which has sometimes been dark, poorly developed, shrivelled, occasionally even purpuric in appearance; in the general symptoms, which were those of debility, with sometimes dry tongue, drowsiness, or low delirium, and in a few cases by hemorrhages from the mucous membrane; and in the result of treatment, which has been most successful when properly adapted to afford support to the vital powers. To this end, quinine, beef-tea, iron, and alcoholic stimulants have been liberally given, while measures depressing in their nature—saline cathartics, antimonials and the like—have been carefully avoided.

Such has been the basis of treatment adopted by the practitioners of this city, or, at least, by such of them as are recognized as *regular*, and who made known their views in a discussion of the subject at one of the sessions of the medical society of this city.

The disease itself still prevails among us; indeed, during the past few days, it has appeared to be on the increase, though milder in its form and more free from unpleasant complications. By an unforeseen delay in transmitting this Report we are enabled to state the number of new cases occurring in March to have been 42; equally divided between the city and hospital.

Of the disease as it occurred in San Francisco, Dr. H. Gibbons has kindly promised to furnish us with the details. From the acknowledged reputation of Dr. Gibbons as an accurate observer and able writer, we are confident that his contribution will be read with interest. San Francisco has, indeed, been the most prominent seat of this epidemic. It has raged there with persistence and a violence never before known in that locality, creating alarm in consequence of its general dissemination throughout the city, its fatality, and the apparent failure of the hygienic means adopted for its arrest.

The incidents of this epidemic—the questions growing out of it, especially as far as they refer to vaccination and the protection it affords against the disease, possess much interest. The great

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discovery of Jenner has been put to a severe test; and though instances have occurred which seemingly justified an abatement of the implicit faith so long reposed in it, a careful examination of facts has only served more and more to strengthen our reliance upon this beneficent measure. That many have taken smallpox, and a few died of the disease who were reputed to have been vaccinated in youth, is true; and this fact has done much towards unsettling the popular mind as to the safety and reliability of the measure, and keeping alive the prejudices which existed against it.

Yet even in these instances it is by no means improbable, indeed there is sufficient evidence for the belief that the vaccination, so called, was spurious or only imperfect. It has been the lot of the writer, as one of the Board of Health, to be thrown into more or less intimate contact with many of the cases which have occurred in this city during the past few months, and he can bear witness to a fact, which the united testimony of other physicians has rendered conclusive, that while there is no positive knowledge of any revaccinated persons having taken the disease, the evidence is certain that in no single instance has a revaccinated person died. On the contrary, the proof of the immunity of protected persons is cumulative—so positive as to admit of no doubt: as, for instance, in families where one has had varioloid, and an opportune revaccination has served as a protection to all the rest. Such cases have constantly occurred, and, while they increase our faith in the saving virtue of the vaccine virus, they also afford conclusive evidence of the necessity of a second resort to this agent after the lapse of a certain number of years.

Evidently, much of the insecurity of vaccinated persons results from its having been imperfectly done, with bad or deteriorated virus, or by incompetent parties, as well as from the neglect on the part of medical men to see for themselves that the operation having been performed, is successful. It is notorious that this precaution is often overlooked, yet how often do we find failures occurring on the first trial alone, with the purest virus, inserted with the greatest care. The public, too, have been at fault in encouraging the pretensions of those who, without any knowledge of the distinction between good and bad virus, or a perfect or imperfect vesicle, have undertaken to vaccinate. Nurses and midwives for money, and kind-hearted, well-meaning women, from motives of the purest benevolence, have gone about from house to house offering vacci-

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nation to those desiring it. They pick up crusts, supposed to be vaccine, generally from the arms of revaccinated persons.

We have examined some of these, and have found them, in several instances, mere concretions of ordinary pus, possessing none of the characteristic appearances of genuine virus.

Is it to be wondered at, that vaccination, thus performed, should prove a failure? Is it strange that the public, ignorant of the sources of error, should sometimes lose faith in the prophylactic efficacy of this the greatest of all the triumphs of our art? Need we, indeed, any longer be surprised, that in spite of the sanitary measures of the Board of Health, and the earnest efforts of all our physicians, cases of smallpox should sometimes occur after vaccination?

The abuse of an agent does not disprove its utility, and, as just now remarked, the evidences in favor of the protective efficacy of well-performed vaccination, as the result of our experience in the present epidemic, are of the most conclusive character.

The success of revaccinations is one of the interesting facts which deserves more than a passing allusion. It is impossible when vaccination has not been systematized, or when it is practised indiscriminately in a community by different physicians acting without concert with each other, to arrive at any very accurate statistical results. Individual experience is our only source of reliance. This we have endeavored to arrive at by consultation with several of the medical men of this city; and adding the results of their observations to our own, the conclusion is arrived at that not less than one in every ten revaccinations was successful.

By this we mean that there was formed a perfectly characteristic vesicle, following its proper course, with a distinct and well-developed areola, maturing at the right time, and presenting at maturity the normal evidences of genuineness. We have seen some of these crusts, and several medical friends have exhibited others, which, when laid side by side with perfect crusts taken from the arms of infants after their first vaccination, could not have been distinguished the one from the other. In most of these cases the vaccination was performed with fresh *eight-day* lymph, taken upon quills; the experience of those in this city who have adopted this plan having demonstrated its superiority over that of using the dried crusts.

The question naturally arises, To what is the success of revaccinations due? Is the protective influence of vaccination performed

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in early childhood, as a rule, so generally lost? Doubtless, imperfect vaccination will account for many of the cases of subsequent success; but may it not be due, in some measure, to a change of climate? May not the climatic influence have brought about such modifications in the constitutions of our people as to renew a susceptibility to the agent? Seaton alludes to this influence as affecting the permanence of the vaccine protection, and this view seems to have been substantiated by the statistics of the present epidemic.

It is due to the readiness with which our citizens have responded to the appeal of the Board of Health, and the recommendations of their medical attendants, that the dissemination of smallpox in our midst has been limited to its actual proportions. Had the same thing been done in San Francisco, in the early stage of the epidemic, doubtless much suffering would have been averted, and many valuable lives saved.

We regard the result, as shown here, as one of the best arguments that could be presented touching the efficacy of perfect vaccination.

It is also worthy of being repeated that, so far as ascertained, not one person who has been revaccinated during the present epidemic has been known to have taken smallpox.

What next? What is to be the succeeding phase of disease after variola shall have spent its power?

The relation of the climate, especially of the valley portions of the State, to cutaneous diseases is interesting. That it is peculiarly favorable to their generation has been remarked by almost every one engaged in practice. Of the summer months, when the cutaneous surface is almost constantly in a state of hyperæmia—of congestion under the influence of an exalted temperature, a condition only partially relieved by the free perspiration which ensues—this is especially true. We have observed the tendency to such diseases peculiarly strong during or soon after the prevalence of the strong north winds of the spring, summer, and autumn, which, having been deprived of moisture by passing over a large extent of arid country, desiccate the cutaneous surface, and exercise an influence over animal life, the depressing character of which has become proverbial. To these causes may be added others the effects of which are due to the reciprocal influence of the cutaneous and mucous surfaces.

The sudden changes so frequently taking place in the tempera-

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ture between day and night, by checking the secretions of the skin, throw an additional burden upon the alimentary surface, producing diarrhœa more or less inflammatory and severe. Hence we see the latter often associated with cutaneous eruptions of various forms—urticaria, erythema, prurigo, and the like.

Nor is it alone in the hot months that the latter are prone to prevail. In the early spring they are frequently seen, especially after the north winds to which allusion has just been made. It is at this season, too, that we have observed other forms—the eruptive fevers proper—as measles, scarlatina, and roseola, either singly or associated with each other or with diphtheria. To whatever special climatic peculiarities it may be due—a subject of which the limits of our report will not permit an extended discussion—the fact of the very unusual proclivity to diseases of the cutaneous and mucous surfaces is certain.

THE VARIOLOUS EPIDEMIC IN SAN FRANCISCO, IN 1868.

By Henry Gibbons, M. D.

The most important feature in the history of disease in San Francisco, in the year 1868, was the rapid development of an epidemic diathesis, in the months of June, July, and August, and its culmination in the ensuing December; a diathesis which, though exhibited most remarkably in the excessive prevalence and fatality of variola, extended to many other zymotic affections. In the first five months of the year, a condition of comparative health prevailed, the mean monthly mortality being 209. In June and July the deaths increased considerably, and after remaining at the increased rate three months, suffered another augmentation in November and December.

It may be observed that there are ordinarily two maxima of mortality in this city, one in July and the other in December; that is to say, a mid-summer and a mid-winter maximum. August, September, and October are commonly the most healthy months in the year. An increase of sickness comes with the cold and wet weather, sometimes in November, more frequently in December.

It should also be noted that the advent of the cold winds and mists of summer, in June and July, is very generally accompanied with an influenza. Even in the interior, beyond the reach of the ocean winds, a tendency to catarrhal epidemics often occurs at this period.

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The winter of 1867–8 was rather rainy, but presented no very unusual features. The spring was unseasonably cool, and the summer also was below the average temperature, and without fluctuations; presenting, in this respect, a character of remarkable uniformity. Mostly there are two or three days in each month of summer, in which the mercury mounts to 80° or 85°, and in rare cases to 90°. But in 1868 it rose no higher than 75°, from the 12th of May to the 6th of October, a period of nearly five months; the mean noon-day temperature of that period being a little under 65½ degrees.

Further, in the excess of cloud and mist the season varied from the common standard. The sky was obscured in an extraordinary degree, the number of days entirely clear being smaller than in any previous year since the American occupation in 1848. But we can scarcely connect the epidemic diathesis with these climatic modifications, inasmuch as the former was general and the latter local. It may be, however, that the local aberrations should be regarded as indicating a general disturbance which eluded the ordinary means of detection, except within certain limits.

There can be no doubt that the prevalence of smallpox was due to a pandemic, rather than an epidemic, influence, which swept over the entire western coast of the Continent, north and south, which is still operative (May, 1869), as appears from the ravages of smallpox and yellow fever in South America, the continued march of variola through California, Nevada, and Oregon, and the existence of scarlatina, measles, and other exanthemata in the same region.

In considering the relations of climate to this pandemic disturbance, it should be kept in view that though the interior climate of California is entirely distinct and different from San Francisco, the disease-producing tide moved onward, undisturbed by the most opposite climatic conditions. Still more significant is the fact that the morbific influence covered an extent of the earth's surface embracing every variety of climate between the North and South Arctic regions; clearly demonstrating that the relations, if any, between epidemics and climate, are not of that character to be appreciated by our instruments and other means of estimating the state of the weather.

Although we may not define the climatic conditions associated with the epidemic diathesis, it is safe, perhaps, to assert that, in many instances, the diathesis is attended by a disturbed or abnormal

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condition of the weather. There may be extremes of heat or of cold, of dryness or of moisture, of storm or of calm; or these conditions may alternate in the same localities; or one may exist here and the opposite there. Such was the case during the last year, over a great part of the American Continent, if not in the eastern hemisphere. Violent storms and extreme heat were noted in the Atlantic States. Extraordinary falls of rain, in addition to other phenomena, occurred on the western coast of the entire Continent. The Sandwich Islands and Japan also exhibited climatic anomalies.

Then there were subterranean and cosmical conditions which might, or might not, have reacted on the salubrity of the atmosphere. Our earth took on one of those volcanic moods to which she is subject once or twice in a century; and in various quarters violent and devastating earthquakes ensued. Astronomers pointed to unusual positions of the planetary bodies, and revived the antiquated notions of malignant aspect in that quarter, or sought to explain the disturbing effect of such positions on the earth's atmosphere, through the agency of electricity or magnetism. Lastly, the path of our planet lay through the nebulous body which gave rise to the meteoric shower of November, and this may have contributed an element to the causation of evil.

That a pestilential influence was operative throughout a large portion of the western hemisphere there can be no doubt. Witness the yellow fever and cholera in the West Indies and in South America; the cattle plague in the valley of the Mississippi and the Atlantic border; and, above all, the prevalence of variola in its most malignant form on a line of nearly ten thousand miles on the Pacific coast.[1]

A more instructive and extraordinary illustration of epidemic influence can scarcely be adduced than the appearance and spontaneous disappearance of smallpox in San Francisco in the spring of 1867, and its reappearance and rapid diffusion in the following year, under the same apparent circumstances, except that more vigorous efforts were made in the latter case to arrest its progress. In the spring and summer months of 1867, about thirty cases were reported at the health office, with eight deaths. But the disease vanished in August, and was not heard of again till the beginning

[1] For a further description of the epidemics of the year 1868, the reader is referred to a valuable paper by Dr. T. M. Logan, of Sacramento, in the *Pacific Med. and Surg. Journal* for April, 1869.

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of June in the following year, when, under cover of some new and invisible agency, it returned with direful consequences.

The rise, progress, fluctuations, and decline of the epidemic, from week to week, are exhibited in the following table, and also the weather of each week. The first column following the date gives the number of deaths in the week; the second and third columns the minimum and maximum temperature; the fourth column the mean temperature.

1868.	Deaths.	Min.	Max.	Mean.	Wind.	Remarks.
June 1 to 7	2	45	67	55.5	W.	Cloudy; windy.
14	9	48	68	58.5	W.	Cloudy; windy.
21	6	50	68	58.0	W.	Cloudy; cold.
28	6	48	72	59.5	S. & W.	Clear.
July 5	6	46	75	59.0	W.	Clear; cloudy; windy; cool.
12	7	52	70	59.5	W.	Cloudy; windy; cold.
19	10	52	67	59.5	W.	Cloudy; windy; cold.
26	13	53	68	59.5	W.	Cloudy; high winds; cool.
Aug. 2	16	52	69	60.0	W.	Cloudy; windy; cool.
9	9	54	68	60.5	W.	Cloudy; windy.
16	23	53	70	59.0	W.	Less wind and mist; warmer.
23	12	52	75	60.0	W.	Cool and misty; warm.
30	7	49	74	60.0	W.	Less cloud and wind; warm.
Sept. 6	21	53	70	61.0	W.	Less wind and cloud; warm; shower.
13	15	49	70	58.5	W.	Cloudy; windy; cool.
20	18	52	66	58.5	W.	Less cloud and wind; cold.
27	17	52	67	60.0	W.	Cloudy; less wind; cold.
Oct. 4	17	53	70	63.0	W.	Mild; tending to rain.
11	13	55	85	65.0	W. N.	Very warm and dry.
18	13	45	68	58.0	W.	Very cool; tending to rain.
25	20	52	72	60.5	W.	Pleasant: great earthquake.
Nov. 1	20	45	75	60.0	N.	Warm and dry; earthquakes.
8	19	49	75	61.0	N.	Pleasant; earthquakes.
15	14	42	66	56.0	N.	Cold nights.
22	22	43	67	51.0	N.	Cold and dry.
29	48	48	62	56.0	N.	Cold; tending to rain.
Dec. 6	31	45	63	55.0	N.	Clear; cold.
13	35	41	63	52.0	N.	Clear; cold.
20	30	41	60	52.0	N.	Rainy and cold.
27	33	48	62	54.5	S.E.	Rainy.
Jan. 3	36	44	64	55.0	N., S.	Rainy and cold.
10	25	43	57	50.5	N.	Mostly clear.
17	13	37	57	50.0	N.	Mostly clear.
24	14	35	58	50.0	N., S.E.	Clear; rainy and cold.
31	25	46	56	51.0	S.E.	Constant rain; cold.
Feb. 7	17	37	59	51.5	S.	Rainy and cold.
14	10	36	57	47.0	N.W.,S.E.	Rain; clear and cool.
21	9	36	60	52.5	S. & W.	Clear; warmer.
28	7	38	69	53.0	N.	Clear and warm; norther.
March 7	6	45	63	56.0	S. & W.	Threatening rain.
14	9	52	72	56.5	S. & W.	Rain; warmer.
21	11	51	65	57.0	S. & W.	Cloudy and rainy.
28	3	49	67	57.5	S. & W.	Cloudy; rain; sea-breeze.

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It is well to consider that, in a number of instances, the deaths of the week were not all reported until the week following. For this reason the figures for some weeks are too large, and should be carried to the weeks preceding. We must also bear in mind that the deaths of any given week represent the attack of the second week previous, the mean duration of fatal cases being about ten days. Again, the infection occurring about two weeks prior to the development of disease, it follows that the number of deaths in a given week is the measure of the epidemic force which existed from three to four weeks previously.

The reader will observe that the disease appeared and established itself during the prevalence of a constant westerly wind; that it increased sensibly in November and December, with northerly winds, and more particularly after the memorable earthquake period; that the advent of the rainy season in December had no marked influence either to diminish or aggravate it; that it abated during the fair weather in the middle of January, and still more in rainy weather which ensued; that it died out rapidly with the pleasant weather of early spring. It is worthy of note that in August, 1867, it subsided and entirely vanished under the same apparent climatic condition which existed at the corresponding date in 1868, when it took root with great vigor and tenacity.

It is curious to trace the relative advance and decline of the several forms of disease, under the operation of the epidemic influence. Hooping-cough led the van as to time, and continued through the year. Diphtheria and croup travelled hand in hand from January to December, with two points of aggravation, the first in June, the second in November and December, corresponding to the two dates where variolous action was enhanced in intensity. Scarlatina was scarcely noticeable till June, after which it kept pace with variola with remarkable regularity, reaching its maximum weekly mortality of 30 in December. These two affections afterwards continued to decline *pari passu*, scarlatina thus keeping company with smallpox more regularly than any other disease. Measles followed, kindling up a month or two later, and reaching its acme of mortality in June: it then abated, almost disappearing from the death-list by December, when smallpox culminated with an average of five daily victims.

The whole number of deaths from all causes in 1868 was 3577, against 2492 in 1867; making a difference of 1085, which is the increased mortality of the epidemic year. This excess was crowd-

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ed into the last seven months of the year, the first five months exhibiting no unusual mortality. Smallpox is charged with 505 deaths, leaving 580 for other diseases. It is well to notice that the increase was confined mainly to the zymotic class, and that many other affections present a mortality beneath the average. The following tables illustrate this point. The first embraces the Miasmatic Order of zymotic diseases, according to the nomenclature now generally adopted, to which I have added Purpura, for reasons to be given hereafter. The second table includes all other causes of death. For the purpose of comparison, the corresponding figures for 1867 are placed in juxtaposition.

Zymotic Diseases: Order, Miasmatic.

	1867.	1868.		1867.	1868.
Variola	8	505	Erysipelas	17	20
Scarlet fever	10	79	Dysentery	33	57
Typhus and typhoid fever	93	119	Diarrhœa	23	57
Diphtheria	66	90	Pyæmia	12	17
Croup	52	64	Purpura	0	11
Pertussis	15	58	Minor diseases	20	26
Measles	8	45			
Total				357	1118

Diseases not ranked as Zymotic.

	1867.	1868.		1867.	1868.
Phthisis	335	378	Cancer	34	58
Pneumonia	174	195	Cholera morbus	5	6
Congestion of lungs	22	29	Cholera infantum	56	62
Hæmoptysis	18	10	Enteritis	76	78
Bronchitis	22	25	Disease of the stomach	22	20
Disease of the heart	104	140	Disease of the liver	58	53
Aneurism	35	53	Peritonitis	28	15
Inflammation of brain	92	109	Puerperal fever	12	14
Congestion of brain	38	36	Diabetes	6	1
Hydrocephalus	52	61	Albuminuria	13	31
Apoplexy	41	56	Dentition	27	22
Paralysis	37	27	Cyanosis	16	18
Epilepsy	6	9	Old age	11	21
Asphyxia	13	7	Dropsy	31	26
Anæmia	12	0	Gangrene	12	6
Atrophy	23	10	Syphilis	31	13
Inanition	20	23	Delirium tremens	10	24
Exhaustion	25	8	Other causes	562	744
Debility	56	71			
Total				2135	2459

Thus it appears that, while zymotic diseases increased their mortality in the epidemic year at the rate of eighty per cent.,

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exclusive of smallpox, the mortality from all other causes increased less than twelve per cent., which was about in proportion to the increase of population. In other words, the epidemic perturbation did not extend beyond the range of zymotic diseases.

Eleven deaths from purpura are reported. The probability is that the most, if not all, of these should be set down to variola, the poison of which acted with such malignity as to overpower the nervous force, and prevent the pathological changes essential to pustulation. Instead of pustules being formed as usual, the cutaneous vessels gave way, allowing the blood to effuse itself after the manner of purpura. The latter disease has never before appeared on our bills of mortality.

In many instances in which the eruptive stage was so mild as to induce a favorable prognosis, the papulæ being thinly diffused and the fever light, the eruption grew thicker from day to day, and a confluent disease was the result, terminating in death.

An impression has prevailed that the Chinese were nearly exempt, or suffered but little; and inquiry was often made to ascertain by what means they were enabled to escape. But the deaths were 32 in a population of Mongolians estimated at 5000 or under. At this rate they suffered much more than their share. It is probable that the Chinese population numbers more than this, say 7000; and on this supposition they suffered about as others.

It appears to be generally conceded that the variolous disorder, both in San Francisco and elsewhere, was of an ataxic type, requiring stimulating treatment; and the conclusion has been deduced that an adynamic constitution prevailed, independently of sensible disease. Some light may be thrown on this question by inquiring whether the mortality of the epidemic period was exhibited in those affections most likely to be rendered more fatal by a general depression of vital power in the population. Under the headings general debility, anæmia, asphyxia, exhaustion, inanition, atrophy, and gangrene, we find 125 deaths in 1868, and 161 in 1867—the preponderance being considerably in favor of the epidemic period, and tending to show that the increased mortality was not due to reduced vitality of the population in general, but to an extraordinary virulence of the zymotic poison, or an extreme susceptibility to its influence not dependent merely on debility.

Retention of urine is stated to have been a frequent accompaniment of the disease in the Smallpox Hospital.

A statement was made public, apparently on good authority, re-

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presenting that variolous pustules and ulcers had been found on the brain and membranes. The following article on the subject, which was presented to the Medical Society of San Francisco by Dr. Henry Gibbons, Jr., appears to me to possess sufficient interest to warrant its introduction in this Report:—

"At a recent meeting of this Society a statement was made to the effect that in post-mortem examinations at the Smallpox Hospital, pustules had been found on the brain and its membranes, and ulcers on the dura mater. In consequence of an invitation extended to the members of the Society to witness a similar examination, I visited the hospital on the 19th day of January, and in company with Drs. Cole, Haine, and Morse, and Drs. Johnson and Miller, who performed the autopsy, had an opportunity of seeing the supposed ulcers of the dura mater. A verbal statement of the results of the autopsy has already been made by Professor Morse, and I shall therefore speak only of the main points of interest. On the removal of the calvarium, the dura mater remaining in situ, we were shown several spots in the dura mater near the longitudinal sinus, and in that part covered by the parietal bones, having the appearance of punched holes. Near by were several small white bodies looking like portions of brain protruding through similar holes; indeed, the condition was pointed out as 'hernia of the brain.' I learned that the appearance in this case was the same as that noticed in the other instances where the so-called ulcers were found, and that it was not claimed that any pustules had been found on the dura mater, but on the brain itself. Upon close examination of the supposed morbid appearances of the dura mater, I was not able to detect any sign of inflammatory action. There was not a particle of pus visible, nor any thickening or reddening of the tissues about the alleged ulcers. I then examined the inner surface of the calvarium, and saw at once that the spots in question corresponded precisely with the foramina in the inner table of the bone, which were much larger than usual, and that the appearance of ulcers was due to rupture of the connection between the veins of the diplöe and those of the dura mater in the act of removing the calvarium. Subsequently the supposed herniæ of the brain were shown to be large Pacchionian bodies. I think no one present doubted this explanation.

"The brain was now exposed by removing the dura mater, which was found adherent to the inner border of the left cerebral lobe, beneath the posterior portion of the sagittal suture, for a space of

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two and a half or three inches long by half an inch wide. On tearing away the membrane, the part of the brain beneath it presented somewhat the appearance of pustules (and it was in this region they were supposed to have been seen before), but I was not told whether it resembled the so called pustules of the previous cases. There was, however, no sign of recent inflammatory action, though the pia mater was highly congested. When the stomach was examined, its coats were found hypertrophied and congested, and its mucous surface softened; but besides this its inner surface had somewhat the appearance of the skin in the earlier stages of the eruption in cases of confluent variola. It was thickly studded with slightly raised spots the size of pins' heads. There was nothing extraordinary in this, however, as pustules are common in the mouth and throat, and are known to exist in severe cases in the stomach and intestines. That they should be found within the skull and on serous membranes is something entirely novel; and feeling that the subject was interesting enough to warrant further investigation, I went to the office of the health physician and examined two specimens alleged to exhibit the ulcers. But I found that they presented precisely the same appearance as the one already described. I therefore concluded to my own satisfaction that there was not sufficient evidence to warrant a belief in the existence of either pustules or ulcers upon the brain or membranes of persons dying of variola.

"To illustrate the subject I have procured and now present for examination the calvarium and dura mater of a man who died recently of hypertrophy of the heart. The foramina in the skullcap of the smallpox case were much larger than those in the specimen now presented, and were, together with the veins passing through them, the largest I remember ever to have seen."

Certain portions of the city which are low and flat, and which border on the bay and are considered malarious, exhibited no attraction for the disease. Neither did those localities where foul effluvia existed, as in the vicinity of slaughter-houses, and along the city front. The section known as Hayes' Valley, a flat region on the western border, enjoyed comparative immunity; and so did the outskirts on the Potrero, and beyond the mission. The same may be said of Oakland and other places in Alameda County, which, though separated by the bay, are in hourly intercourse with San Francisco; while some villages at a much greater distance,

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having but little intercourse with the metropolis, were almost depopulated.

The comparative exemption of certain localities cannot be ascribed to the protective power of vaccination, nor to any extraordinary sanitary measures, for the reason that there was no difference in these respects between one locality and another. It belongs, however, to the history of epidemics in general, that there are often no palpable conditions of locality, capable of explaining the irregular distribution of the pestilential virulence.

In the course of the epidemic, sanitary measures of the most stringent character were employed. Means were adopted for universal vaccination, which, however, from a variety of causes, failed of complete application. Disinfectants of all kinds were resorted to, without avail. An excited and feverish condition of the public mind, which always prevails under similar circumstances, demanded efficient action on the part of the municipal authorities, and held them responsible for the continuance of the plague. Houses with smallpox patients were marked and placarded, and guards were sent to prevent egress and ingress. These measures led to acts of cruelty, which would disgrace a barbarous people. An officer thus placed on guard, announced through the newspapers that, having discovered a man sick with smallpox, he immediately nailed up the house, and sent word to the health office to have him moved to the smallpox hospital; but that no attention was paid to the application, and consequently the sick man and his wife were imprisoned from morning till night, without the means of procuring food or medicine! In another instance a case of smallpox was reported in a boarding-house, occupied by fourteen persons in all, most of whom were mechanics. The house was quarantined for more than a week, the well being imprisoned with the sick, except as they might steal forth secretly, eluding the guard. Similar cases were of common occurrence. It may well be questioned whether more good than evil resulted from all the sanitary measures adopted, excepting vaccination.

There is no doubt that much evil was done by the infusion of terror in the public mind, through the press and otherwise. Especially was the smallpox hospital, to which a large proportion of the sick were carried, the object of distrust and dread. The public were treated to the most exaggerated accounts of the terrors of this institution, and informed in so many words that whoso entered its

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gates left hope behind. When despair was thus invoked, no wonder that death should tread closely on its heels.

In no large city in the world is so great a proportion of the population isolated from friends and kindred, as in San Francisco. The same may be said in a general way, of the whole Pacific Coast. Doubtless this circumstance has the effect of increasing the fatality of disease, particularly of an epidemic which is the subject of popular aversion and terror. Hence, the barbarity which always attends the panic created by a plague, was exhibited to a disgraceful extent, with less of that mitigation which the devoted attachment of relatives afforded in older communities. Men who are the first to fly from the victim of pestilence, are apt to be loudest in denouncing others for not rushing to his relief. In this way does a plague develop some of the worst traits of human character. Individuals who raise the loudest outcry against the civil authorities for not providing the means of relief for the sick, may be the first to put the torch to a hospital, if it be erected near their own habitation.

In time of health, these things should be pondered for the benefit of the community in future emergencies. People should be impressed with the important truth, that protection and safety do not depend on segregation or quarantines, but rather in the adoption, each one for himself, of personal precautions. Let me state a fact of immense magnitude in its bearing on this question: During the prevalence of smallpox in San Francisco, covering the greater part of the year, not a physician contracted the disease, nor a professional nurse, nor a solitary member of the families of physicians and nurses. The Sisters of Mercy, who had charge of the hospital, and never left the building, escaped unharmed. While a majority of the subjects of the epidemic contracted it without conscious exposure to contagion, those persons who armed themselves properly with the shield of the immortal Jenner, walked unscathed amid the rankling pestilence, whilst ministering to its victims. It is also a fact that the disorder seldom spread among the inmates of a quarantine house. Compelled to face the enemy, they adopted the means of successful defence. Not so, those who relied for safety on quarantines and police regulations.

It is impossible to determine, with precision, the proportion of deaths to cases; but there is no question that it was very large. Nor have I any doubt that many fatal cases occurred among the vaccinated, although statistics on this point are wanting. Whilst placing

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a high value on the protective agency of cowpox, candor compels me to acknowledge that the *wearing out* of its influence was painfully demonstrated, and consequently the necessity of revaccination. It is not enough that this should be practised on adults alone, or those who have been vaccinated within a given number of years. To make it effectual, it must be universal; excepting, it may be, children who have been vaccinated within a year or two. I would not, however, with my present experience, advise even this exception.

It has been supposed that a change of climate and country weakens the protective power of vaccination, and that the population of California, being largely composed of persons born and vaccinated elsewhere, suffered excessively on this account. But facts do not warrant the supposition. On the contrary, the families of native Californians suffered more than any other class, even when they had been subjected to vaccination.

I was unable to discern any evidence that a plurality of punctures was better than one, or that the lymph was better than the dried crust. Persons from European countries in which two or three punctures are employed, and the lymph inserted from the arm, furnished their full quota of victims.

In regard to the treatment, I have little to say. Influenced by the popular idea of debility, of diminished vital force, of the necessity for "restoratives" and stimulants in disease, practitioners mostly pursued a supporting and stimulating plan, of which alcoholic drinks formed the essential part. Success has been claimed for the treatment. Be this as it may, the mortality was great, almost beyond precedent.

I will conclude this report with a series of propositions which embody the results of my own experience in the recent epidemic, and in other visitations of the disease since the year 1827, in connection with the views of leading authorities in Europe and America.

1. Smallpox does not spread extensively unless quickened by an epidemic influence. It may exist in a city continually, from year to year, a few cases at a time, without displaying an active contagion.

2. During an epidemic aggravation, *recent* vaccination is the only safeguard. Persons who have had smallpox, or who have been exposed to it in former years with impunity as nurses and the like, are not secure from attack.

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3. During an epidemic, the proportion of protected persons (those who have had smallpox or who have been vaccinated), who may take the disease, varies exceedingly; it is sometimes nearly one-half, sometimes only one in ten.

4. The mortality in the unprotected varies from 20 to 50 per cent.; in the protected from 2 to 5 per cent.

5. The duration of an epidemic is from six months to a year. It seldom progresses steadily, but fluctuates without relation to *sensible* changes of climate. Sometimes it almost disappears, and then kindles up with renewed energy. Winter is the season most favorable to its extension.

6. During a variolous epidemic, diseases known as zymotic are more frequent and more fatal. Other diseases may not be aggravated.

7. Foul emanations from sewers and so forth have little to do with it. They may affect the general health, but do not promote, in a marked degree, the spread or duration of the epidemic.

8. The idea of arresting the disease when it has become epidemic, by isolation, non-intercourse, fumigations, and similar means, is fallacious. So is the belief that the disease cannot be contracted without contact with, or exposure to, the perceptible sources of contagion.

9. When the disease is not epidemic, the morbific germs emanating from a patient soon lose their vitality. But when an epidemic influence prevails, the germs resist decay, and infest the entire atmosphere. They are supposed to enter the blood through the lungs. They do not cause sickness unless the condition of the individual be favorable to their development. In an infected city, many persons—perhaps most of the inhabitants—receive them in the blood without perceptible injury.

10. Disinfectants, such as chlorine, carbolic acid, the fumes of sulphur, etc., will not destroy the germs of smallpox unless so concentrated as to destroy or endanger human life. Sunlight, air, and heat are the best disinfectants. Clothing is perfectly disinfected by baking in an oven, or by exposure for a short time to a temperature at or above that of boiling water.

11. The period of most active contagion is after the appearance of the eruption and during the process of scabbing. It is questioned by some good authorities whether the disease is at all contagious prior to the formation of pustules.

12. Whenever smallpox shows a tendency to become epidemic

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in a city or neighborhood, every individual should be speedily vaccinated, no matter what may be his previous history or experience relative to the disease. The only exceptions are children who have been vaccinated within one or two years; and even these should be revaccinated if the disorder break out in their dwelling or in a neighboring house.

13. Vaccination will not take perfectly a second time in more than one or two of every hundred persons.

14. It will take partially, with some resemblance to the genuine kine-pock, in 25 per cent. of the cases. Here the presumption is that revaccination was useful.

15. In a large number, say 30 to 40 per cent., the only effect is an itching which follows the operation within twenty-four hours, and lasts a day or two, with slight redness at the spot. This result is satisfactory, showing that the virus was active, and that it has failed because the original vaccination retains its full protective force. In children recently vaccinated, it is mostly impossible to produce any other result than that last described. The longer the time since the original vaccination, the greater is the probability of success from repetition.

16. A large scar is no evidence of genuine vaccination, nor is a large and painful sore. These may indicate nothing more than a common ulcer or a poisoned wound. A spurious pustule is often worse than genuine vaccinia.

17. A few individuals will take vaccination again and again, while a few are completely invulnerable. The latter are considered to enjoy a like immunity from smallpox.

18. When revaccination is not followed by itching or any other effect, it should be repeated. The virus may not have been active.

19. It is declared by several recent authorities that the protective power of cow-pock is increased by making three or four vesicles instead of one. Further proof of this is required. It is well, however, to vaccinate in two places.

20. No other virus should be employed than the lymph or crust from the first vaccination of a healthy child; or that taken directly from the cow. There is less uncertainty in the former than the latter.

21. The crust should never be kept long after mixing it with water. It soon develops a virulent poison.

22. There is but little ground for the dread of constitutional disease as a result of vaccination. Experience proves that it is

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difficult, if not impossible, to communicate syphilis in this way, from a vaccine crust.

23. In some rare cases a latent scrofulous, or or other constitutional disease may be called into action by vaccinating with pure virus; or the vaccination may be followed by boils or eruptions such as healthy children are subject to. But vaccination is more likely to cure than to create cutaneous disorders.

24. In vaccinating, it is best to avoid extensive incisions or abrasions, as they not only tend to produce large and painful sores, but also to develop inflammation and suppuration which may impair the specific virtue of the cow-pock.

25. The extreme cases of inflammation and sloughing which occasionally follow vaccination, are to be referred to some peculiar condition of the patient, rather than to the nature of the virus employed. In certain states of the system, the slightest scratch festers and makes an ulcer. History tells of deaths resulting from the scratch of a pin.

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REPORT

OF THE

COMMITTEE ON CLIMATOLOGY AND EPIDEMICS IN MASSACHUSETTS, 1868-9.

BY

HENRY I. BOWDITCH, M. D.

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REPORT OF THE COMMITTEE ON CLIMATOLOGY AND EPIDEMICS IN MASSACHUSETTS, 1868-9.[1]

THE undersigned, immediately after being informed by the Secretary, that he had been appointed a Committee on the above-named subject, sent letters to the secretaries of the several District Societies (17 in number) into which the Massachusetts Medical Society is divided, requesting reports from their several districts. It was hoped that by this method more accurate returns would be procured, than by any other course. The undersigned regrets that his success has been very imperfect, as will be seen by the papers hereunto annexed. Only four of the seventeen districts have responded. Moreover the documents from these four have evidently not been presented as complete and exhaustive of the subject proposed. They are, however, valuable as giving the experience of intelligent practitioners of medicine, some resident on the coast, and others, for many years, actively employed in the various localities treated of. The report from Suffolk Co., prepared by the undersigned, with the assistance of the City Registrar Mr. Appolonio, is of the same character with the others.

In looking at these various reports, it may be stated generally that, during the past year no very severe and fatal epidemic has swept over Massachusetts. Although scarlatina has been very rife in Middlesex and Suffolk, and perhaps other counties since the autumn, it still exists in Suffolk, but of a very mild type.

Epidemic influenza has been generally prevalent during the past winter, which has been very open, with much less snow than usual, and not unfrequently rain, which during our northern winters, is an unusual occurrence.

The following extract from a letter from the city registrar of Boston, confirms the above statements, while at the same time it

[1] Received too late for action by the section, but published with the suggestion of the secretary of the section.

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shows the mortality observed from several of the more important diseases.

"On looking over my table of last year's mortality, I do not discover the prevalence of any particular disease, or that any one locality suffers more than the same locality suffered in previous years. Maladies regarded as contagious appear in about the same proportions as in former years. I give a list from a few of the more prominent causes of death during the past year.

Consumption	868
Pneumonia	358
Other lung diseases	86
Scarlet fever	267
Croup	127
Diphtheria	67
Typhoid fever	120
Cholera infantum	488
Dysentery	113
Diarrhœa	101
Total number of deaths during 1868	5419
Population in 1867	205,000"

The undersigned is painfully aware of the very imperfect character of this report; while preparing it, the question has arisen whether a better result could not be obtained if a material modification was made by the Association, in the organization and operations of any future National Committee on Climatology and Epidemics. Though several valuable papers, some of them very elaborately written, have been presented by individual members of the various National Committees on this subject during past years, there has been no *national labor*, so to speak, ever performed or even attempted. It would be hard to get any clear idea embracing *the whole country*, from these various reports scattered through past volumes of our *Transactions*. Everything in them of value is necessarily local, and for each State or part of a State. It would seem that such work should belong more appropriately to the various State Associations. The American Medical Association should endeavor to take wider views, and should study climatology and epidemics over the larger area covered by the nation. We have the fairest opportunity for these studies, as our wide country embraces within its limits the colder regions of the north, and the more genial, sunny climes of the south. The effects of an ice-cold atmosphere, and of an almost tropical heat, with all their intermediate shades of temperature, and the varied influences of the

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Atlantic and Pacific Ocean climates, with that also of our vast Mississippi Valley, could be studied by this Association by an appropriately appointed committee. Such a national committee should be a unit, and could take views of questions in their bearings upon the whole Union. No such committee has ever existed, and such a plan has never been attempted, and moreover it never can be attempted under the present cumbrous arrangements of annually choosing one man from each State, and allowing him to choose his own questions, and to follow his own method of investigation. There is now an immense amount of wasted brain-work, and of actual manual labor in preparing what are really only local and special topographical and climatological reports. This is certainly unfortunate for the Committee and for this Association.

Whether any better plan can be devised it is impossible for the undersigned to say, although he may have a decided opinion on that question. It is always much easier to criticize a plan actually in operation, the defects of which come distinctly out to view under the various difficulties it has to encounter, than to present another and a better method.

One or two hints, however, may be thrown out, which, if good in themselves and agreeable to the wishes of the Association, may help to solve the question whether any change should be made.

First. It is suggested that a *Central* National Committee on Climatology and Epidemics should be chosen, small in number, and the members of which should be resident in one of our large cities, or in its immediate vicinity. Such committee might consist of five members, who should be men interested in the subject, and would agree to hold office and to work duing a certain number of years, then to give way to another committee resident near another city, or if the association thought best it could continue in office for a second period of service.

Second. This committee should be appointed by the president for the time being, as he would be able to decide by correspondence, and otherwise, the best men to be selected. If, during their period of service any members should resign or die, the remaining members should be allowed to fill vacancies. If desirable, one member of the committee might, by rule, leave each year, but the president might reappoint any one who might be thought too valuable a man to be lost to the committee. In this way the committee, while gaining annually perhaps new vigor, would have a degree of permanency requisite for continuing long investigations.

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Third. This committee should hold regular or special meetings, and keep records thereof, abstracts of which might be presented each year to this body. It should as soon as possible after the annual meetings of this Association, prepare plans for investigating diseases and their relative prevalence; their causes, etc., throughout the Union. For that purpose they should send a few questions at a time, and should by all possible means procure some answer from every State. How this should be done should be left to the committee to decide; but no full report should be made until answers were obtained from all quarters, even if it should take years to procure them.

The topographical distribution of disease could be studied with great advantage by such a plan judiciously carried out. An answer each year to a *single question* from the whole expanse of the country, would be worth all the individual State Reports heretofore made, or any future report to be given under our present plan. For example, it would not only be very interesting, but a most important question in reference to public health, to learn whether the law that *residence on a moist soil is a cause of phthisis* (which years ago was proved to exist in New England, and which still more recently has been proved to hold good in Old England), prevails in this country, from Eastport to the Rio Grande, and from the Atlantic to the Pacific.

One, or perhaps two questions, issued by such a National Committee as is suggested, and answers obtained by real labor on the part of the Committee could settle this important point not only for America, but in all probability for the civilized world.

And this is only one question, hundreds of others could be prepared, and if thorough reports were made from answers returned from all quarters of our country, we could, by means of the vast machinery of this Association, elucidate many questions relative to public hygiene, and to diseases which under our present method will never be solved.

In order to bring this subject fairly before the Association, a resolution is appended and offered for the consideration of the meeting.

Respectfully submitted by

HENRY I. BOWDITCH.

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Resolved, That ——— be a committee to consider and report at the next annual meeting whether any better plan can be devised for the constitution and labors of the Committee on Climatology and Epidemics of the American Medical Association.

REPORT (A) FROM THE BARNSTABLE DISTRICT MEDICAL SOCIETY.

By Dr. Doane, of Hyannis.

As one of the Committee appointed by the Barnstable District Medical Society, on Climatology and Epidemics in that district, I would make the following report:—

1. Climatology.—That the Cape, or that part of it as far down as Chatham and Orleans, varies greatly in soil and climate, between the north and south sides. On the north side, the soil is almost wholly more clayey and heavy, and better calculated for cultivation than the south side; and the winters five degrees, if not more, colder, from the prevailing winds of the bay, blowing directly upon the place. In the summer the opposite prevails; and the south side is much cooler, from the prevalence of S. W. winds directly from the sound; so that, in respect to temperature, the climate is much milder in winter and cooler in summer on the south side. Woods of about four miles in width extend the whole length between the north and south sides of the Cape, preventing the cold and heat from being carried readily across. On the south side the soil is sandy and beachy, and after going below Orleans, the remaining towns are the same throughout their whole extent, so much so, that twenty-four hours after a heavy rain but little standing water will remain. Here another peculiarity of climate shows itself, in the greater prevalence of fogs, especially in the spring and early summer, on the south side, which are prevented from reaching the north side by the dense woods. In a twenty-five years' residence here, I have observed these peculiarities, but of their effects upon disease we have no statistics to show, although I have not observed any more consumption in proportion to number of inhabitants on the north than on the south side of the Cape; the soil moisture of the north side being, perhaps, counterbalanced by the increased amount of fogs on the south side. There are many clear, sandy-bottom ponds on the Cape, and not many bogs and

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swamps, especially since many of them have been drained, and turned into cranberry meadows; and the water is of the purest quality generally, so that as far as miasmatic influences are concerned it is the paradise of Massachusetts. The great prevalence of damp east winds, and sudden changes of temperature which prevail, predispose to the various forms of rheumatism, neuralgia, and inflammatory affections of the lungs. In the winter, we never get those low temperatures, of twenty and more below zero, that prevail in Boston, and interior towns of the State. The lowest temperature ever noted here since my residence, is five below zero, and it seldom reaches zero during our coldest weather. The last year has been an uncommonly damp season; mould forming in houses in very dry localities, and during no time of the year could there be said to be a drouth. The winter has been very mild, with but very little snow.

2. EPIDEMICS.—In respect to epidemic diseases in the district, during the year, but very little can be said. Some mild epidemics of scarlet fever, measles, hooping-cough, influenza, and mumps have prevailed. To show the healthy state, especially among children, I would say that in my own place (Hyannis), with about 2500 inhabitants, only three children, under ten years of age, have died during the year, and none of them of epidemic diseases; and this is about a fair sample of the other places in the district. In respect to fevers, there have been scarcely any typhoid, and other diseases have not assumed a typhoid form, but have been more gastric and inflammatory in their character.

GEORGE W. DOANE.

HYANNIS, MASS.

REPORT (B) FROM THE BARNSTABLE DISTRICT MEDICAL SOCIETY.

BY DR. STONE, of Wellfleet.

1. CLIMATOLOGY.—The climatology of Cape Cod is like that of the eastern slope of New England, characterized by sudden changes, damp, cold east winds, predisposing to congestion and inflammation of respiratory organs. I do not think acute inflammation is so prevalent as formerly, but chronic affection of the lungs, founded in that atony of the system we call scrofula, is the cause of nearly half our mortality. The deterioration of mothers is very marked in our vicinity, the bent form, the "all-gone" expression, that betokens

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disease of the uterus or its appendages, give a melancholy prospect for hardy posterity.

2. EPIDEMICS.—Our vicinity has been almost entirely free from any epidemic the last year. There has not been much typhoid fever, diarrhœa, or dysentery. There has been an epidemic influenza during the last two months, not very severe, still, long and troublesome.

T. N. STONE.

WELLFLEET, MASS.

REPORT FROM THE MIDDLESEX SOUTH DISTRICT SOCIETY.

By Dr. VAUGHAN, of Cambridge.

DR. H. I. BOWDITCH.

DEAR SIR:—The few suggestions following embrace all that I have been able to collect, which seems to bear directly upon the subject of your report.

The older practitioners of the Middlesex South District agree that the district has been very free from epidemics of exceptional importance within their recollection; the malignant dysentery of 1847–8 being almost the sole exception. This, again, was a repetition of the epidemic of 1817. A full account of it is contained in a paper by Dr. Morrill Wyman, in the *Transactions* of the American Medical Association, Vol. II.

It appeared in old Cambridge in July, 1847, reached its height in the early part of September, and disappeared on the approach of winter. In 1848, it reappeared, and ran a similar course, but with less violence in old Cambridge, but was very fatal in Cambridgeport and Brighton. It also visited other parts of New England, both inland and upon the seaboard, being more fatal in the less crowded towns, than in the large cities. No cause could be traced in the water, food, or other influences. Carthartics, emetics, local and general bleeding were of no avail. Opium was tolerated in very large quantities, and proved the main dependence.

Within the past ten years, epidemics have been neither violent nor of wide range, not even excepting that of variola in 1858–9, which on the whole was more alarming than malignant, although a number of fatal cases occurred in this vicinity.

In 1861–2, an epidemic of rubeola created a panic, which nearly emptied our public school-houses, and spread into the neighboring towns, but the number of fatal cases was not large.

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In 1864, a considerable number of cases of diphtheria occurred, but not enough to warrant the title of epidemic.

In 1865, a slight epidemic of rubeola.

In 1865–6, scarlatina and dysentery, the former pervading in that year and the next, nearly the whole district. The dysentery was not wide spread nor generally malignant, but some cases occurred in Cambridge, of a fatal character, which brought to mind the malarial dysentery of the south and southwest.

In 1868–9, the present year, an exceptional epidemic of influenza, so called, has visited the whole district, as well as other parts of New England.

Scarlatina and rubeola, have prevailed in the district. In Cambridge, the former has hitherto greatly predominated. In other towns, rubeola has taken the lead, as in Newton, Waltham, etc. At present in Cambridge, scarlatina is abating, and rubeola taking its place; elsewhere the reverse obtains. They have not been characterized by any thing peculiar, excepting that cases are often complicated by the prevailing influenza.

The last named epidemic disease deserves a little fuller notice. It has been more remarkable, perhaps, for its extensive range, the large proportion of the population attacked, and its obstinacy under treatment, than for any exceptional violence; an exception to this may be made in the case of young children.

Like other epidemics, it has taken a sthenic or asthenic form, according to the constitutional condition of the subject. In those beyond middle life, especially women in delicate health, entire recovery has often been postponed for six, eight, or ten weeks, and an irritable congested state of the fauces has in some instances remained for a longer time.

As to locality, it made its first appearance in Cambridge in a part of the town which, although inhabited by the better class of the population, is in the vicinity of the lowest land, where the drainage is deficient, and the sandy layer is thin and approaches the clay. No part of the town has been exempt. I have seen some of the worst cases in the healthiest and best drained parts of the town.

With regard to its phenomena, it justifies in general the name which Flint applies to the disease, viz., epidemic bronchitis, although the whole mucous tract is effected, more or less, from the frontal sinuses, to the smaller ramifications of the bronchia, its force being expended upon different parts, according to individual peculiarities.

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In some cases, the conjunctivæ, and sometimes the lachrymal ducts have been especially affected. In a very large proportion of cases, the pharynx has suffered the most severely.

It generally begins like other febrile diseases, with a chill, followed by pyrexia. Sometimes, however, the first symptoms noticed have been in the pharynx, and trachea. In my own case, I felt first an uneasy sensation of dryness below the larynx, which increased in spite of treatment. There were absolutely no constitutional symptoms until the end of the third day. The subjective symptoms do not differ generally from those of other epidemics, including debility, languor, anorexia, with furred tongue, thirst, headache, pains in the back and limbs, soreness of throat and sternal region, cough, with muco-purulent expectoration, etc.

The physical signs in the thorax, are those of bronchitis; mucous râles on both sides, etc. There is an appearance in the back part of the pharynx in well-marked cases, which is somewhat peculiar, suggesting the idea of a charge of small shot under the membrane. It is doubtless caused by the distended mucous follicles, although the papules are smaller than those we usually notice in follicular pharyngitis, possibly because we usually see them in a more chronic state of enlargement.

The average duration of the acute stage is a week or ten days, but in many cases much more, and convalescence is sometimes indefinitely prolonged.

In young children, the disease often takes a violent and sometimes an alarming form. The child is prostrated at once, and the subjective phenomena are those of acute pneumonia. The absence of dulness and other signs of affection of the substance of the lung and the symmetrical development of mucous râles alone point out the nature of the attack. In some cases, the vital heat has risen very considerably, as indicated by the thermometer.

I am not aware that there have been any fatal cases of the disease.

Respectfully your obdt. servant,

CHAS. E. VAUGHAN.

CAMBRIDGE, April 14, 1869.

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REPORT FROM THE MIDDLESEX NORTH DISTRICT SOCIETY.

By Dr. Gilman, of Lowell.

Lowell, Mass., April 14, 1869.

Sir: In accordance with your request, I herewith submit a brief report on the Climatology and Epidemics of this city for the year 1868.

Lowell has a population of 39,000 or 40,000 inhabitants, and is mostly built upon a sandy plain, at the confluence of the Concord river with the Merrimac. The central part of the city is intersected by canals, that furnish the motive power to the several manufacturing corporations, near which are located the boarding-houses and residences of the operatives employed in these establishments. This portion of the city is well drained and policed, with the exception of a few streets occupied by the poor Irish. The rising ground on the outskirts is occupied by the dwellings of the well-to-do citizens.

The total number of deaths during the year was 857, which would indicate a very unhealthy year, there being 217 more than in the preceding year, and, with one exception, more than ever before. No *fatal* epidemic or contagion has prevailed to any extent, except scarlet fever; this disease was unusually prevalent, and of a malignant character. There were 95 fatal cases, 80 more than last year, and the largest number ever reported. No reason can be assigned for this great increase of mortality. It was not confined to any particular locality nor class of society, but seemed to be about equally fatal in all. Two fatal cases of cholera occurred among the Irish, though they lived in separate sections of the city. I know nothing of the history of either case. Epidemic catarrh prevailed extensively in December, 1868, and in January, 1869, though there were no fatal cases. Consumption, as usual, is the most fatal disease, numbering 156, about one-fifth of all the deaths in the year, and the greatest number since 1859. Deaths from this disease are distributed quite equally through every month in the year, which is not unusual here. Comparatively, the greatest number of deaths from consumption occurred in the Irish sections of the city. Inflammation of the lungs numbered 42 deaths, six more than the year before, and more than the average. Cholera infantum numbered 44 deaths, a larger number than the average for the last ten years. These occurred almost wholly in July and August. Typhoid fever numbered 26 deaths, one less

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than last year, but more than the average number. These deaths took place in nearly every month of the year.

Subjoined please find a meteorological table for the year; also a table giving the number of deaths from some of the most prevalent diseases during the year, compared with former years.

Respectfully submitted.

JOHN H. GILMAN.

Meteorological Table.

1868.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Mean temperature [Fahr.] at 6½ o'clock A.M. for each month of the year	16°	10°	25°	34°	47°	59°	67°	63°	53°	39°	29°	18°
Mean temperature [Fahr.] at 2 o'clock P.M. for each month of the year	29	29	42	50	60	76	84	79	68	55	40	30
Depth of rain and melted snow for each month of the year [in inches].....	3.51	1.21	3.35	5.57	9.03	4.45	0.86	2 84	11.63	0.96	4.69	1.45

Number of Deaths from some of the most Prevalent Diseases in the last ten years, and total number from all causes.

Diseases or causes of death.	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	Tot'l
Dropsy of brain.....	32	31	14	17	17	15	19	25	34	9	213
Cholera infantum.....	38	39	49	31	20	31	50	32	35	44	369
Consumption.....	176	154	150	141	143	153	123	128	146	156	1470
Croup.....	24	24	31	22	26	12	12	20	14	14	199
Disease of heart.....	22	22	24	22	15	8	15	24	13	32	197
Dysentery.....	26	9	10	3	10	11	13	21	4	17	124
Infantile.....	59	43	40	39	29	27	28	21	23	44	353
Inflammation of lungs..	38	54	31	21	43	37	24	25	34	42	349
Marasmus.....	7	19	12	13	7	7	14	6	3	8	96
Scarlet fever.....	46	11	14	53	85	17	26	2	15	95	364
Typhoid fever.....	15	11	28	16	16	17	17	23	27	26	196
Diphtheria	...	...	1	15	39	34	7	18	11	3	128
Total number of deaths from all causes.....	739	720	713	641	695	633	575	749	640	857	6962

REPORT FROM THE WORCESTER NORTH DISTRICT SOCIETY.

By Dr. Colony, Fitchburg.

Fitchburg, April 13, 1869.

Dear Sir: Dr. C. C. Field, of Leominster, reports the prevalence, during the past year, in that town and vicinity, of an influenza, characterized by marked bilious complication, and terminating usually, in a short time, with a complete disappearance of all symptoms of bronchial inflammation.

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In Fitchburg, and this locality, we have to report as prevalent, to an unprecedented extent, during the spring, epidemic rubeola. Many hundred cases occurred, and no insignificant proportion of them were complicated with severe bronchial inflammation and congestion, terminating fatally in quite a number of instances. At the same time, and subsequently, roseola prevailed to a considerable extent. Scarlatina, in a mild form, has prevailed during the fall and winter, but, so far as I am aware, without a fatal result.

The influenza alluded to by Dr. Field, of Leominster, as prevalent there, has also been observed in the vicinity of Fitchburg. Many severe, and several fatal cases, having occurred within our limits. Severe anginose diseases have been observed, more especially during the winter months.

During the summer months, cholera infantum was more prevalent, and more fatal than has been observed for several years. It was especially observable that an increase of the disease took place immediately after a few days of extreme heat.

I am not aware that typhoid or gastro-enteric fevers have been any more prevalent than usual, and should say that less of such a character had been observed than an average.

I am yours respectfully,

GEO. D. COLONY,

Secretary of the Worcester North District Medical Society.

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REPORT OF THE SECTION

ON

Medical Jurisprudence, Hygiene, and Physiology.

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REPORT OF THE SECTION

ON

MEDICAL JURISPRUDENCE, HYGIENE, AND PHYSIOLOGY.

MAY 4, 1869.

SECTION organized at 3½ P. M., by the appointment of Dr. J. F. HIBBERD, of Indiana, Chairman, and J. K. BARTLETT, of Wisconsin, Secretary.

A paper was read by Dr. S. B. CUTLER, of Mississippi, upon the Physiology of Longevity.

On motion this was returned to the author with the recommendation to publish it in some medical journal.

A paper was presented by Dr. LEWIS A. SAYRE, of New York, containing interesting cases of *Lead Paralysis produced by the Use of Cosmetics.*

On motion it was referred back to the Association with recommendation that it be published in the *Transactions.*

The report of the Committee, Dr. JOHN ORDRONAUX, Chairman, upon *Commissioners to Aid in Trials Involving Scientific Testimony,* was read by the Secretary.

On motion it was referred back to the Association with recommendation for publication; and with the further recommendation that the same committee be continued for another year, and requested to draw up the form of a law which would meet the requirements of the case.

JAS. F. HIBBERD, *Pres't.*
J. K. BARTLETT, *Secty.*

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THREE CASES OF LEAD PALSY

FROM THE USE OF

A COSMETIC CALLED "LAIRD'S BLOOM OF YOUTH."

BY

LEWIS A. SAYRE, M. D.

PROF. ORTHOPEDIC SURGERY, BELLEVUE HOSPITAL MEDICAL COLLEGE.

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THREE CASES OF LEAD PALSY FROM THE USE OF A COSMETIC CALLED "LAIRD'S BLOOM OF YOUTH."

CASE 1.—On the 27th September, 1868, I was called to see Miss ——, of Kansas, who had been sent to me from that State, by Dr. Logan, to be treated for disease of the spine, and paralysis of the forearms.

I found a very tall beautiful woman of about 19, of remarkably large frame, very erect, with both hands dropped at nearly a right angle at the wrists, and perfect inability to extend them. She could not extend the fingers in the least, or extend or abduct either thumb. The muscles were more atrophied, and the forearms and hands more wasted than any case I had at that time ever seen.

The largest circumference of the forearm just below the elbow was eight inches, circumference at wrist five inches. The interosseous spaces on the back of the hand were very distinct, and the adducens, and extensors of the thumbs, as well as all the muscles in the palms of the hands were so atrophied, that the contours of the first metacarpal bones on either side were almost as conspicuous as they would have been in a skeleton, with a tight glove drawn over it.

She was unable to feed herself, comb her hair, pick up a pin, hook or button her dress, or in fact make any movements whatever with her hands, except the *very slightest flexion* of her fingers. She had been in this condition for some months, and was gradually getting worse. She could flex and extend the forearms, and could elevate the arms almost to a right angle with the body; but was perfectly unable to extend the hands or fingers in the least. She could walk tolerably well, but was not very steady or elastic in her step, and easily became exhausted. Going up or down stairs was done with great difficulty, and I observed that, to sit down, or get up from a very low seat, required all the muscular exertion of which she was capable.

On removing her clothes to examine the spine, I found that she was sustained in the very erect position, which had attracted my

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attention, by "Taylor's Spinal Supporter," a most valuable apparatus in cases where its use is indicated, and I naturally inferred that she must have been suffering from some disease of the spine. On removing the supporter, which weighed three pounds, her head and trunk immediately bent forward; and with her arms crossed on the chest, the hands dropped at the wrist, at almost an acute angle with the forearms, she presented an exact counterpart of the "Grecian Bend" photograph, which has been so common in the shop windows for the past year or more.

I examined her spinal column with the greatest possible care, by concussion, compression, extension, bending her forward, backward, laterally; and by rotating the spine upon the pelvis, so as to put every ligament upon extreme tension, and subject every cartilage and bone to firm pressure, without the slightest evidence of pain or inconvenience. I therefore concluded that if she had ever had Potts' disease of the spine, it was the most perfect cure that I had ever seen.

She gave the following history of herself: That in the summer of 1866 she had bilious intermittent fever for some weeks, which prostrated her very much, and after slight fatigue she had a relapse from which she recovered very slowly. That in September she took a ride on horseback, a distance of ten miles, and on her return the horse ran off, and carried her at great speed nearly a mile. She exerted all her strength to stop him, without effect, and was finally compelled to put him into a fence. She was very much exhausted, but did not dismount until she reached home, a distance of some two miles or more. A few days after this great exertion, she found "her hands were getting weak—first discovered it by accidentally dropping a skillet out of her hands at a candy pulling." She then noticed that a book would frequently drop out of her hands while reading, and that she could not strike the piano keys correctly, or with as much force as formerly, and that her arms and hands were getting much thinner.

She came to New York to consult me; but as I was absent from the city, she was recommended to Dr. C. F. Taylor, to try the Swedish Movement Cure. The Dr. diagnosticated her case as Potts' disease, and applied a spinal supporter. She was very ill for some days at Dr. Taylor's establishment in Broadway, with what the Dr. states in his letter to Dr. Logan, of Leavenworth, was spinal osteitis. Dr. Thomas, who saw her at this time in consultation, informs me that he considered her case as one of hysteria.

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She was sent home after a few weeks, with the spinal supporter applied, and which she has continued to wear until the present time, having been assured that her hands and arms would soon recover their use, after her back got well. I mention these facts, not in the way of censure; but simply to show the difficulty of diagnosis, and the danger of drawing wrong conclusions, without the most careful observation, for this very case was published in the *Quarterly Journal of Physiological Medicine*, April, 1868, pp. 282–3, as a case of carnomania.

Her back seemed to be supported by the brace, and she could walk with her body more erect; but her entire muscular system grew weaker, she could walk only a short distance without great fatigue, and her forearms and hands wasted so rapidly, that in a few months she completely lost the power of *extension*, and for the past year had been perfectly helpless, and had to be dressed and fed like a child.

As I could find no evidence of disease in the spinal column, or cord, and no organic lesion of the nervous centres, my diagnosis was that there was no "Potts' disease," but a case of "Lead Palsy." The usual blue margin of the gum was not conspicuous, but between each of the teeth the gum was more purple than natural.

I made most careful inquiry to ascertain the source of the lead, but was not successful. They had no lead pipes in the house to contaminate the water drank, but took it from a spring in wooden buckets, had used no lead in painting the house, had drank nothing from lead-pipes, or been exposed to its influence in any way that I could ascertain even after the most careful inquiry.

Prof. Wm. A. Hammond saw her in consultation on the following day, and without my giving him any hint or information, confirmed my diagnosis of lead palsy, although from the mother's description he expected to find a case of "Potts' disease," and examined her especially for it.

Not being able to ascertain, after the most careful inquiry, any source from which the lead could have been received into the system, he stated that it might possibly be a case of muscular atrophy from excessive use, and unless the muscles could be stimulated by the continuous current of galvanism, the prognosis was very unfavorable.

The exertion of stopping the runaway horse seemed to justify this opinion. I applied a powerful Battery of Kidder's, without producing any muscular contraction.

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As there was rather profuse menstruation, attended with great pain, and intense vaginismus; and as Dr. Thomas had informed me that there was an hysterical element in the case when he had seen her two years before, I called Dr. Marion Sims in consultation Sept. 27th, 1868.

The pain of examination was so intense that, having no chloroform at hand, we had to postpone it.

Sept. 28. Dr. Sims and Dr. Neftel saw her with me, and I had to carry the chloroform to profound stupor, with stertorous respiration, before Dr. Sims could make any examination of the vagina. No serious disease was discovered save this intense vaginismus. Dr. Neftel stated that he had seen three cases of "lead palsy" in which vaginismus had been a prominent symptom. Is it a symptom of the disease in females?

On again examining her for the source of the lead, she asked me "if it could possibly come from the whiting." On asking her what that was, she informed me that it was the *Bloom of Youth*, used for the complexion, and manufactured by Laird, 74 Fulton St., N. Y. She had used nearly a bottle a month for about two years and a half; but for the last eight or nine months had been compelled to have the application made by an assistant, as she was unable to apply it herself.

She gave me the remnants of a bottle of the "Bloom of Youth," which, upon analysis by Prof. R. O. Doremus, was found to be highly impregnated with acetate and carbonate of lead.

I immediately put her on large doses of iodide of potassium, commencing with twenty grains a day, and increased it up to ninety. Collecting the secretion of urine for the following three days, I also sent it to the Dr. for examination, and received the following reply:—

NEW YORK, October 8th, 1868.

MY DEAR DOCTOR: The sample of urine you sent me yields a small quantity of lead.

Yours cordially,
R. OGDEN DOREMUS.

PROF. SAYRE.

After she had been under the use of the iodide of potassium for about one week, the Kidder's battery, at the same strength as at first applied without effect, now produced quite vigorous contractions.

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Its use was now continued every other day, for about thirty or forty minutes at a time, with most marked improvement.

Believing that the natural position of the fingers was important to sustain the circulation, and that voluntary exercise was necessary to increase the nutrition and development of the muscles, I got Dr. Hudson, the manufacturer of artificial limbs, to construct for her a very light extension apparatus for the hands and fingers, which answered the purpose most admirably.

Dr. Hudson has made another set of these instruments for me in another case, which are so great an improvement upon the first that I will refer to them in the description of the case in which they were applied.

With the instruments properly adjusted she could play upon the piano remarkably well, and I think that this use of her hands materially aided in expediting her recovery, which is now almost perfectly complete.

I received a letter from her dated Nov. 25th, 1868, written in a most beautiful hand, and in which she states, "My hands have improved wonderfully, and beyond all expectation. . . . My left hand, which you will remember, I could only raise for a second, and then with great difficulty, I can now use *better* than I could my right hand when you saw me two weeks ago. My right hand has improved so rapidly that I can extend the fingers almost perfectly straight. . . . I have gained over twenty pounds, and my arms measure at the wrist six and a quarter inches, and just below the elbow nine and a half. And I feel better in every particular than I have for more than two years."

CASE II.—Mrs. ——, residing on the Hudson River, came to me, Nov. 1868, suffering from complete paralysis of the extensor muscles of both hands, and of all the fingers, caused by the use of "Laird's Bloom of Youth." The arms were cold, the interosseous muscles were wasted, as well as all those upon the posterior aspect of the forearms.

The paralyzed muscles gave no response to a current from a strong Kidder's battery. The arms measured above the wrists five inches, below the elbows seven and a half inches.

Three years ago she commenced using "Laird's Bloom of Youth," for the complexion. After a year she began to suffer from nausea, pain in the back, colic-like pains, frequent headaches, with general debility. Shortly after this she began to observe *weariness* in the

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extensor muscles of the wrists and forearms, both hands having a tendency to drop.

Drs. Clark and Thomas, of this city, saw her in consultation with her regular attending physician, Dr. Hasbrouck; by them the case was considered (as the patient states) as one of "paralysis and nervous debility, with dyspepsia."

She continued to use the cosmetic at the rate of about a bottle a month.

The paralysis of the extensors increased continuously, until for the last six months she has become perfectly helpless as regards the power of extension of the hands or fingers. She has to be fed and dressed by her maid; in fact, has no more use of the hands than if they were dead.

She walks with an inelastic step, stumbles on going up and down stairs, and becomes easily exhausted upon any muscular exertion. In this case there was slight blueness on the margin of the gums.

I gave her 90 grs. of iodide of potassium every day, with dilute sulphuric acid, and ordered a "Turkish bath" twice a week. At the end of one week the battery applied with the same power produced manifest contractions. This was applied every other day for twenty or thirty minutes, friction and shampooing of the muscles, with passive movements every day. And in three months she had so far recovered as to dress herself—even to the putting on of a well-fitting glove, and also buttoning it. At the end of five months she had entirely recovered, and gained twenty-eight pounds in weight.

CASE III.—Miss ——, of Maryland, aged 21, came to me in April 1869, with complete loss of power of all of the extensor muscles of both forearms. The hands were wasted to a skeleton, and the interosseous spaces on the back of the forearm of either side were so conspicuous and deep that when her forearms were prone and flexed at a right angle with the arms, water would remain in them like a trough. (See Fig. 1.)

She stated that five years before, in 1864, she was exposed to intense cold, very thinly clad, that both of her arms were nearly frozen, and looked almost transparent. This exposure was followed by a rheumatic fever, confining her to bed for three months. During this attack, and after her recovery, she was troubled with severe constipation, frequent attacks of colic, and constant

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nausea. Was compelled several times to resort to croton oil to secure an action from the bowels.

In 1865 she went to Canada to be under the charge of Dr. Mack, who treated her for some uterine trouble (was it vaginismus?), and also applied the actual cautery to the lower part of the spine, but all without any benefit, as the colic, cramps in the stomach, nausea, and general prostration remained the same as before.

In 1866 she first began to notice the dropping of her hands and the wasting of her forearms. About this time she made a violent exertion in attempting to hold a hard pulling pair of horses in their attempt to run away with her, and immediately after lost all power over both of her hands. The flexor muscles after a while recovered slightly, but the extensors of the fingers and hands have remained powerless until the present time.

Dr. S. Wier Mitchell, of Philadelphia, has treated her for the last two winters with electricity, but so far as extension of the hands or fingers is concerned without the slightest apparent benefit.

She states that the muscles of her arms and shoulders have very materially improved under Dr. Mitchell's treatment, and that her general health is somewhat better, but that her hands and fingers are the same as at first, and that Dr. M. had given her a very unfavorable prognosis.

Dr. Mitchell's knowledge, skill, and experience in the use of electricity being equal, if not superior, to any one in this country, I felt satisfied that she had had all the benefit that that agent alone could give her, and I asked her if he had ever suspected that lead had anything to do as an agent in causing the paralysis. She replied that he had not; but that she had recently informed him of my first case, which was so similar to her own as to attract her attention, and stated to him that she had used the same material, "*Laird's Bloom of Youth*," since she was sixteen years of age. He then gave her iodide of potassium, but as there was no improvement he was inclined to think that lead had nothing to do with it.

My impression is, judging from the result since, that he did not give the medicine in sufficient quantity.

I applied the electrodes from a seventy cell Kidder's battery, and also from a powerful battery of Drescher's, without producing the slightest contraction of any of the extensor muscles except a very feeble action in the extensor-minimi-digiti and a barely perceptible action in the extensors of the ring fingers. Sensation was not entirely abolished. The same battery with only thirty cells

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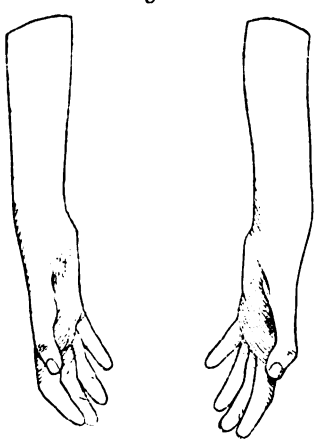
when applied to the shoulders or lower extremities produced strong muscular contractions. I immediately put her on 90 grs. of iodide of potassium a day, and as soon as the specific eruption of this medicine began to appear upon the face and neck, the same battery began to produce manifest contractions.

Fig. 1.

Lead palsy from use of "Laird's Bloom of Youth," from a photograph.

Fig. 2.



Casts of the same, taken for the purpose of fitting Dr. Hudson's extension apparatus, from a photograph.

The electricity (continuous current) was applied about fifteen minutes every day, and she wore Dr. Hudson's extension apparatus

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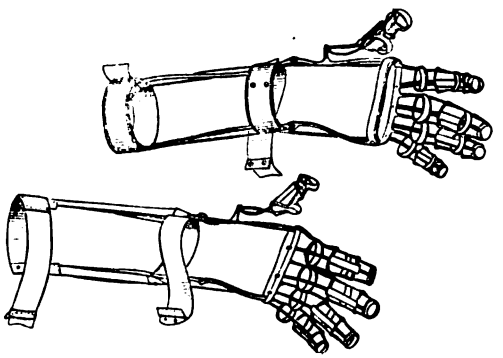
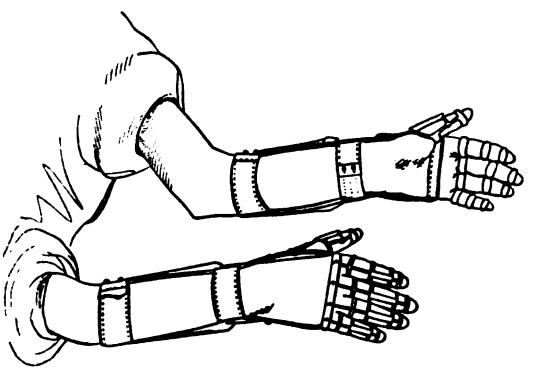
most of the time day and night. At the end of three weeks, without the extension apparatus, she was able to take a plate of ice cream in her left hand, and feed herself with a spoon in the right, a thing she had not done for two years.

Fig. 3.



Dr. Hudson's extension apparatus for hands and fingers.

Fig. 4.



Dr. Hudson's extension apparatus applied.

Of the value of Dr. Hudson's apparatus in cases of this kind I cannot speak in too high terms. It is very light and beautiful, is worn without any inconvenience, enables the patient to exercise the muscles of the hands and fingers constantly, and thus materially facilitates nutrition and development. The annexed cuts give a very good idea of its construction; but to have it neatly made I would advise the patient to employ Dr. Hudson in person, corner Fourth St. and Broadway, New York City.

The cuts are from photographs, by Mr. Mason, Photographer to

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Bellevue Hospital, and give an accurate representation of the position of the hands without the instrument, of the action of the instrument, and also of the instrument itself.

Sufficient time has not yet elapsed for her entire recovery, but judging from the improvement made, and the result in the two other similar cases, I feel warranted in giving a favorable prognosis even in this almost hopeless case.

The use of cosmetics has within a few years become so very common, even among the better classes of society, and as most, if not all of them, are equally as dangerous to use as the particular one described in this Report, I have deemed it my duty to place these cases before the profession, that, knowing their injurious effects, they can guard their patients against thus voluntarily poisoning themselves through ignorance.

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REPORT

TO THE

AMERICAN MEDICAL ASSOCIATION,

ON THE SUBJECT OF

THE APPOINTMENT OF A COMMISSIONER IN EACH JUDICIAL DISTRICT OR CIRCUIT, TO AID IN THE EXAMINATION OF WITNESSES IN EVERY TRIAL INVOLVING MEDICO-LEGAL TESTIMONY.

BY

JOHN ORDRONAUX,
CHAIRMAN.

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REPORT OF COMMITTEE ON THE SUBJECT OF "THE APPOINTMENT OF A COMMISSIONER IN EACH JUDICIAL DISTRICT OR CIRCUIT TO AID IN THE EXAMINATION OF WITNESSES IN EVERY TRIAL INVOLVING MEDICO-LEGAL TESTIMONY."

THE position of medical experts before courts of justice is one of an eminently ambiguous and contradictory character. Called to expound some of the most recondite problems in natural philosophy, to a jury of laymen, and compelled to submit themselves to a direct and cross-examination at the hands of lay-counsel, it is not difficult to understand why testimony in the form of professional opinions given under such circumstances, should, by the mutual misapprehensions of counsel, witness, and court, be converted into a solemn farce, too often terminating in a verdict against evidence. All writers upon the law of evidence agree in considering opinion-testimony as a *paradox* in that field of judicial inquiry; and while endeavoring to lay down rules for its admission and government are compelled to admit that no uniform system has hitherto been adopted by courts in availing themselves of its assistance in actions involving scientific problems. Oscillating between the greatest latitude on the one part, and the most confined limits upon the other, it may be said that no parallelism can often be found in the decisions of the same court. And from inability of arriving at any fixed principles, the present tendency is to look with distrust upon every form of skilled testimony, and to abandon it to the risks of polemical detraction and obloquy.

That some remedy is called for in the interests of both humanity and justice, all are ready to admit, and that the remedy must be as far reaching in its effects as the disorder it is intended to alleviate, is equally apparent. But the difficulty lies in so apportioning the one to the other, as to derange no well-established principles of jurisprudence. The present constitution of nisi prius courts is one which has grown up through centuries of experience, and though forms of procedure in them are often changed, the fundamental

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ideas embraced in their organization are found to be more nearly adapted to a swift and economical administration of justice than any other that can be framed. In them the judge interprets and expounds the law, while the jury determine the relative application of its principles to the issues of fact raised before them. The provinces of judge and jury are therefore eminently distinct. In the admissibility of evidence, the judge determines its competency, the jury its credibility and weight. The jury are the triers of the issue, which, in order to come before them, must be an issue of fact, and the judge only guides them legally, but cannot decide anything which belongs to their province.

Again, witnesses are divided into two classes, viz., *ordinary and skilled*, but it is plain that the latter term is a legal misnomer, since a witness means one who knows personally from sight, or hearing something relating to the transaction which forms the issue, yet this need not be the case with an expert. The first error, and that which taints all subsequent proceedings, is introducing any expert *as a witness*. He is not one under any interpretation of the term. The civilians long ago perceived this inconsistency between names and duties, and one of them, Baldus, has more truly and emphatically, than any writer whom we have met with, laid down the true doctrine, in relation to medical experts at least, by asserting that "*medici proprie non sunt testes, sed magis est judicium quàm testimonium.*" And, as we have before said, all writers upon Evidence are forced to call expert testimony a paradox, although offering no suggestions towards altering the forms of procedure governing its introduction and rendition. Yet these forms were meant to meet the requirements of ordinary testimony alone, hence the ceaseless judicial ambiguities and contradictions to which they have given, and will always continue to give rise. It is impossible in fact to reconcile the duties of experts, with the position they are constrained to occupy in courts, nor to accommodate the present rules of evidence to the paradoxical phase which theirs assumes. Since these laws, saving this tortured application of them, are found to work well, there seems to be no valid reason why a good system in itself should be changed. Reason and experience both protest against so unwise a course. But what is wanted is an entire separation of the field of expertism from that of ordinary rules of evidence. The expert being in no proper sense of the word a witness, but rather an *amicus curiæ*, should have his status definitely determined, should be freed from alliance with either party, and give

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his opinions when asked always in writing, and upon an agreed statement of facts. In other words, he should arbitrate, and not testify. So long as he is introduced as a witness, the opposite party has the right to confront, and necessarily to cross-examine him, but how unphilosophical, and even ridiculous is the idea of an expert being cross-examined, for the purpose of testing his professional knowledge, by a layman. The entire effect and benefit of his participation in any trial, is thus mutilated, deformed and nullified by the legal paradox which assumes him to be a witness. Witness to what? His own opinion, only.

In order to obviate the effects of these contradictions in the laws of evidence, since, while the expert is called to express an opinion, he must yet utter none which sounds to a determination of the matter at issue, it would be well, for it is entirely possible, to remove all experts from the field of testimony, and place them in that of arbitration, so far as any particular scientific question is to be decided. For this purpose, whenever a scientific question arises in an action at law, whose solution is material to the determination of the matters in issue, let a feigned issue be made on this point, and referred for judgment, upon evidence agreed upon, to three experts, one to be selected by each party litigant, and the third by the court, such experts to sit and determine at once the question in dispute, and their opinion to be received by the jury as conclusive of the issue tried by them. In this way each suitor would be represented, just the same as if the expert had been called into court by him; the evidence on which an opinion is sought being agreed upon, time and arguments would be saved; no examination nor cross-examination would be had, since there would be no witness to require such, and the opinions of experts being given upon deliberation, and while they themselves are freed from the annoyances, vexations, and irritations of a personal discussion with counsel, would be of a more satisfactory character to all parties, by expressing the best possible efforts of an unembarrassed mind. A simple clause introduced into existing codes of procedure, or a special statute, where such codes are not to be found, would meet the required necessity.

There would be a grave objection to appointing "a commissioner in each judicial district to aid in the examination of witnesses in every trial involving medico-legal testimony" in the fact that such a duty could only be performed by introducing him as an intermediary to court, counsel, and jury, and his question might be as

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much objected to as those of opposite counsel, and as the court would ultimately have to decide upon them, no practical benefit would ensue. As it is, counsel are at liberty to employ experts to aid them by prompting in questioning others, if they choose. But nothing is gained to the cause of justice by this, since the expert examined is still in a paradoxical position, and compelled to undergo the cross-fire of a double examination. Again, if commissioners on medico-legal examinations were to be appointed, by parity of reason, commissioners on every branch of scientific inquiry would be called for, and we should find that the illimitable field of scientific problems would require commissioners in navigation, architecture, engineering, ship-building, and every branch of professional knowledge that can be made the subject of judicial investigation. Instead of simplifying the proceedings in actions at law, they would be complicated and rendered more tedious.

The only course which strikes us as at all feasible, or expedient in the premises, is,

First. To exclude experts from the field of witnesses (which they are not), and place them upon the independent basis of arbitrators.

Second. To compel parties when they call them (as in the manner heretofore suggested), to accept their judgment as final upon the issue tried by them. In other words, that they shall be stopped from questioning its validity before the jury, whatever exceptions they may take to it, on an appeal from the verdict rendered.

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REPORT OF THE DELEGATE

TO THE

ASSOCIATION OF SUPERINTENDENTS OF ASYLUMS FOR THE INSANE FOR 1867-8.

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REPORT OF THE DELEGATE TO THE ASSOCIATION OF SUPERINTENDENTS OF ASYLUMS FOR THE INSANE FOR 1867-8.

THE undersigned, in accordance with the appointment conferred upon him by this Association, has the honor to report:—

That he attended the annual meeting of the Association of Medical Superintendents of American Institutions for the Insane, held at Boston, Mass., on the 2d, 3d, 4th, and 5th days of June, 1868.

That he was most cordially and hospitably received by the President, Dr. Kirkbride, by whom he was introduced to the Association, and, on motion, was unanimously invited to participate in its discussions.

That he addressed the Association on the objects which he presumed this body had in view in appointing him its delegate; conveying to its members your kind regards and friendly greetings; assuring them of the deep interest you take in all their deliberations and discussions; giving a brief history of what this Association has done on the subject of insanity in the past; expressing a belief that it stands ready at any time to co-operate with that body in any proper and feasible measures for the promotion of mutual interests, and advancing the cause of science and humanity. Your delegate also took the liberty of expressing a regret that their Association had not yet thought it expedient to unite itself more closely with this great representative body of American physicians, and expressing the opinion that such union is for our mutual and reciprocal advantage, and that it ought to be effected without further delay. He, moreover, thought it his duty to express his high appreciation of the valuable services that Association had rendered to the cause of science and humanity during the twenty-three years it had existed as an associate body; in conclusion assuring its members of your hearty congratulations and good wishes. In reply, the able President, Dr. Kirkbride, observed that he believed these remarks were listened to with great interest by the members of his Association, and that they reciprocated most fully all the good

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feelings and respect which this body entertained towards them; in which sentiments, Dr. Pliny Earle, and other members, expressed their hearty concurrence.

A committee was appointed, on the suggestion of Dr. Tyler, of the McLean Asylum, Mass., to draw up a statement of the reasons why that Association had thought best to keep itself separate and distinct from this body; but, so far as your delegate is informed, this committee, composed of Drs. Tyler, Ray, and Chipley, made no report.

The time of that Association, during the four days it was in session, was almost wholly taken up in the discussion of the "project of a law for regulating the legal relations of the insane." The subject was most ably discussed in all its bearings and relations, and the project of a general law, as finally adopted, was indorsed by every member of the Association present, and has since been published at length in the proceedings of that body, as well as the *American Journal of Insanity*, *The Journal of Psychological Medicine*, and other periodicals.

The undersigned may be permitted to express his belief that the legal provisions recommended, contain such an adjustment of the rights and duties, the abilities and disabilities, both of the insane and all others directly or indirectly connected with them, as is consistent with exact justice to all, and especially promotive of the highest welfare of this most unfortunate class.

All of which is respectfully submitted,

CHARLES A. LEE, M. D.,
Delegate.

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PRIZE ESSAY.

QUININE

AS A

THERAPEUTIC AGENT.

BY

Dr. S. S. HERRICK,

OF LOUISIANA.

Opinionum commenta delet dies
Naturæ judicia confirmat.

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PRIZE ESSAY.

QUININE AS A THERAPEUTIC AGENT.

THE bark of Peru, or Jesuits' Powder, since its introduction into Europe in 1640 as a remedy for intermittent fever, had not only superseded all other agents for arresting this malady, but its use had been extended to a wide range of complaints, mostly periodic in their character. Analyses had been made by various chemists, first with the view of determining its proximate components, and afterwards of discovering and isolating its medicinal constituents. Pelletier and Caventou, the celebrated French pharmaceutists, in 1820 first succeeded in obtaining the crystallized alkaloids, in which its value chiefly consists. The consummation of this discovery has immensely magnified the importance of cinchona, and placed its chief alkaloid, quinia, in the very foremost rank of the pharmacopœia throughout the civilized world.

In the writer's view, before entering upon the main subject, the therapeutical consideration of quinine, it will be useful to notice its effects upon the system in health. As the sulphate of quinine is the preparation in general use, it will be understood that this is the salt spoken of, unless some other is specified.

PHYSIOLOGICAL ACTION.

Quinine is readily absorbed by all the mucous surfaces, and within a short time after ingestion is found in the blood, bronchial mucus, saliva, tears, milk, and serum. It is also absorbed rapidly when thrown into the cellular tissue, efficiently on a blistered surface, and slowly through the entire skin. Elimination is effected

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chiefly through the kidneys, and it may be detected soon after administration in the urine by a solution of iodide of potassium containing free iodine, which throws down a brown precipitate. Soon after the disappearance of its obvious physiological effects, this test fails to discover its presence. It is also eliminated, in a much less degree, by the perspiration and feces.

Irritation of the *primæ viæ* sometimes follows its exhibition, manifested by nausea and vomiting, or griping and diarrhœa. This, Prof. Wood regards as an exaggeration of its tonic effect on the mucous surfaces, and the febricular movement following as a sympathetic extension of the same.[1]

Caventou attributes to quinine an excitement similar to that produced by coffee. Withnann likens the excitement to a paroxysm of intermittent fever.[2] The writer has often observed the latter effect, in a degree so well marked that patients believed they had undergone another slight paroxysm.

Dr. Thomas Fearn, of Alabama, regards it, in large doses, rather narcotic than stimulant.[3] It certainly is a powerful hypnotic, in sedative quantities; and below this point often produces abundant diaphoresis.

In death following excessive doses, injection of the vessels of the pia mater has been a *post-mortem* observation, indicating meningeal inflammation.

Among the most prominent effects of quinine are those nervous phenomena termed *quininism* or *cinchonism*. This is manifested most decidedly upon the organs of the special senses, especially that of hearing. Together with a feeling of cerebral fulness, there is a ringing in the ears under the use of a moderate quantity. With large doses, partial deafness and confusion of thought ensue; while still larger ones may produce total temporary deafness, disturbance of vision, vertigo, muscular prostration, and even insensibility and collapse. The effect produced by a given quantity varies exceedingly with natural susceptibility and modifying circumstances, and usually passes off in a few hours. A state of anæmia seems to exaggerate and prolong these effects, and the drug is more active when taken fasting, as absorption is more rapid by an empty stomach than a full one.

Trousseau and Pidoux[4] regard it as definitely settled, that quinine

[1] Therapeutics and Pharmacology, 1868. [2] Dunglison, New Remedies, 1856.
[3] Dunglison, op. cit., from Transyl. Journ. Med., 1836, passim.
[4] Therapeut. et Mat. Med., 1858.

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in large doses possesses a sedative and hyposthenic action on the whole nervous system, and more especially on that portion which governs the circulatory apparatus.

"It is," say they, "more truly than digitalis, the opium of the heart, for it diminishes both the number and force of the contractions."

The effect of large doses of quinine in diminishing the force and frequency of the pulse, has led to observations on its effect upon the temperature of the body. Experiments show that very large doses lower the temperature as well as the pulse, but with ordinary medicinal doses, the results are by no means marked or uniform. Clinical observation in the wards of Charity Hospital, New Orleans, during the past winter, showed no considerable variation of temperature in the treatment of intermittent fever; while the administration of three 10-grain doses in a case of pleurisy exaggerated the inflammatory action, as shown by a rise in temperature from 100° to 103.5°.

Recent observations by the writer in the same institution, in the treatment of intermittent fever, have obtained similar results. Three or four 5 gr. doses were given in each case, and the temperature was observed at the time the first dose was taken, and several times afterwards at intervals of two hours. The following cases will serve for illustration:—

April 14.—Mary C. 1st observation, temperature 98°; 2d observation, temperature, 98.5°. Mary R. 1st observation, temperature, 99°; 2d observation, temperature 98.5°; 3d observation, temperature 99°.

April 15.—Mary C. 1st observation, temperature 99°; 2d observation, temperature 98°; 3d observation, temperature 97.5°. Mary R. 1st observation, temperature 99°; 2d observation, temperature 99.5°; 3d observation, temperature 98.5°.

In these cases the threatened paroxysm was averted, while in another, the remedy was taken too late, and the temperature rose successively to 101, 102, and 103°.

Trousseau and Pidoux attribute to quinine all the febrifuge properties of cinchona, but not all its tonic virtues, and regard it as more irritating to the *primæ viæ* than bark.

Prof. Wood[1] attributes all the virtues of cinchona to its alkaloids; Waring,[2] all except astringency. The late Dr. J. W. Monette, of Washington, Miss., maintained that quinine contains the febrifuge

[1] Therap. and Pharmacol., 1868. [2] Practical Ther., Am. ed., 1866.

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essence of bark without any tonic property whatever, and that it is febrifuge because contra-stimulant.[1] According to Briquet, a dose of 15 grains begins to show effect in a quarter of an hour; 6 grains in one hour; less than 4 grains is not observable. In doses of 2½–4½ grains, quinine stimulates the circulation, respiration, and nutrition;[2] in 9 grains and more, it acts as a nervous sedative. Thus it resembles alcohol, ether, chloroform, digitalis, opium, heat, cold, light, and electricity. It acts more on the ganglionic nervous centres than opium, and less on the brain.

Pecholier, in common with other practitioners of Montpellier, does not ascribe all the properties of cinchona to quinine, but considers cinchonine as its complement, though he grants some therapeutic qualities to the kinic and tannic acids.[3]

Dr. Geo. Mendenhall, of Cincinnati, in 1845 experimented with quinine, in doses of gr. ij–xx, and found that the pulse was first quickened and then retarded.[4] After large doses there is great reduction of nervous power, manifested by yawning, sighing, and trembling; the skin pale, cool, and moist; the face pale or livid and shrunk. It first deranges, then enfeebles, and finally destroys function, in excessive doses, having produced a previous stage of excitement, the duration of which is inversely proportioned to the quantity taken. It then becomes actually poisonous and sometimes fatal, in proof of which, cases are on record; but the line between safety and danger has not been accurately defined. Varying circumstances of natural susceptibility, and the effects of disease would render it impossible to lay down any definite rules.

In poisonous doses, according to Melier and Magendie, it deprives the blood of its coagulability.[5] Legroux found the fibrine diminished and the corpuscles increased. Briquet, from experiments upon animals, has determined that quinine increases the liquor sanguinis and diminishes the corpuscles. Dr. Ronzier-Joly,[6] who has had large experience in the fevers of Algeria, mentions a case of dropsy unmistakably dependent upon this remedy. Prof. Wood thinks it more reasonable that the diminution of fibrine is due less to the remedy than to the disease for which it is given.

According to Dr. H. Ranke[7] and Dr. W. A. Hammond,[8] late Sur-

[1] Stillé's Therap. and Mat. Med., 1860.
[2] Traité Thér. de Quin.
[3] Bouchardat, Ann. de Thér., 1864.
[4] Am. Journ. Med. Sci., July, 1846.
[5] Waring, op. cit.
[6] De l'Administration du Sulfate de Quinine, 1856.
[7] Med. Times and Gaz., May 30, 1857.
[8] Am. Journ. Med. Sci., April, 1858.

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geon-General U. S. A., quinine causes a diminution of uric acid and an increase of urea; while in intermittent fever there is an increase of uric acid in the urine. In the course of elimination, irritation of the urinary passages is sometimes produced, together with copious diuresis.

On the digestive organs, the effect of small doses is to promote their functions; while large ones cause derangement, and under unfavorable circumstances even inflammation. Small doses sometimes constipate, and large ones loosen the bowels.

NATURE AND MODE OF THERAPEUTIC ACTION.

Briquet[1] holds that quinine arrests all kinds of intermittent paroxysms by its sedative action on the nervous system, especially the portion controlling the calorification and circulation of the blood. Thus it is simply palliative, acting neither on the cause nor the tissues, but curing like opium in delirium tremens.

Dr. Still6[2] maintains that the mode of action of quinine in periodic diseases must be either, (1) by regulating and moderating disorder of the nervous system, or (2) by directly neutralizing a material poison or causing its elimination. He adopts the latter view, and regards it as a direct antidote.

Prof. J. H. Salisbury,[3] the noted advocate of the cryptogamic origin of miasmatic fevers, though recognizing a material poison, does not regard quinine as its antidote. Here are his views:—

"While we should constantly keep quinine in the front rank, to impart tonicity to the ganglionic and cerebro-spinal systems and to the epithelial tissue, and to control in the body cryptogamic development, we should use diaphoretics, diuretics, and expectorants freely as eliminatives. . . . Quinine as a prophylactic enables the system to resist the paroxysms. . . . Quinine is not then, strictly speaking, a curative or specific agent. In the Southwestern States it appears at first to have some influence in enabling the system to resist the paroxysms, but soon loses almost entirely its power, and in many instances actually aggravates them. This arises from derangement of the eliminative functions, and until these are restored, the tonic action of quinine tends to increase the mischief."

In a work published at Berlin in 1863, Dr. Binz gives the result

[1] Traité Thér. de Quin.
[2] Ther. and Mat. Med., 1860.
[3] Am. Journ. Med. Sci., Jan. 1866.

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of numerous experiments on the effects of quinine upon the lower forms of organic life. One-eight-hundredth part, added to an infusion of hay containing animalcules in an active state, caused their instant death; and one-two-thousandth part proved fatal in a few hours. Morphia, strychnia, and creasote had less power, and permanganate of potassa alone seemed to possess more. He found quinine to have great control over the development of mould in vegetable solutions, and also of the yeast sporules in bread, being surpassed, however, by the bichloride of mercury. The vinous fermentation also was checked by this agent.

With reference to its antiphlogistic properties, he found the peculiar amœboid movements of the white blood corpuscles instantly arrested by one-fifteen-hundredth part of quinine. Strychnia, veratria, and atropia were less powerful in this respect, but conia more so. On exposing the mesentery of a frog to the action of the atmosphere, the inflammatory process thereby excited caused an active movement of the white corpuscles of the blood, followed by transudation and degeneration into pus globules. This process was arrested by the subcutaneous injection of quinine.[1]

Mr. R. Walker[2] maintains these views:—

"Quinine is held to be a direct tonic on insufficient grounds, its real action being that of a sedative to the efferent nerves of the sympathetic, for the following reasons: That it requires a very much larger dose of quinine to produce its physiological effects in robust persons than in the debilitated; and in extreme asthenia even small doses are poisonous. That it decreases the force and frequency of the pulse. When given in inflammatory fever, it restores the activity of the secretions. The following practical points will be found true: Quinine is only useful in dyspepsia which results from febrile irritation; it should be used in sthenic rather than asthenic cases of inflammation; it is not suitable in diseases of the heart."

Prof. Wood attributes to quinine the general properties of the tonic bitters on the blood-making functions, and besides a special action on the cerebral functions; in moderate doses gently stimulating, but in excessive quantities exaggerating, deranging, and finally suppressing them. He supposes that its operations are mostly confined to the centres near the base of the brain, those of special sensation and those controlling the organic functions. Hence we seldom see mental excitement or delirium resulting from this

[1] Lancet, March 28, 1868. [2] Braithwaite, part xlvii.

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remedy; but disturbance of hearing and vision, and of respiration and circulation. He regards quinine in doses of gr. ss–j, not exceeding gr. vj daily, as a simple bitter; from gr. vj to xij daily, in divided doses, as acting on the brain, and often very decidedly, causing first buzzing and ringing in the ears, then deafness and sense of weight, tension, and fulness; from gr. xij to lx, as a sedative to the circulation, diminishing the force and frequency of the pulse, and producing giddiness and sometimes blindness. This sedative action he regards as secondary, being preceded by a stage of excitement which overwhelms the nervous centres, producing a partial paralysis. He believes that a cure is effected in intermittent fever by breaking up the morbid habit. If the cause cease to exist, or susceptibility to its influence be lost, the cure is permanent. This action is dynamic, on the vital properties of the part affected, and not through chemical combination with the tissues, which would retain the alkaloid. The remedy, therefore, is not antidotal, and it cures irritative intermittents even more readily than the miasmatic. The same is true of intermittent neuralgia, where no miasmatic cause could be suspected. Probably it acts by its powerful influence on the nervous centres, on which the miasmatic cause also acts. These centres, being preoccupied by the stronger action of the remedy, become insensible to the morbid agent, and the habit is broken.

Dr. C. Handfield Jones,[1] Physician to St. Mary's Hospital, holds the following views:—

"Quinine seems to exert its influence on the cerebro-spinal and visceral sympathetic nerves. It slows the heart's movements, and prevents the hyperæmic affluxes that take place in malarious disease from vaso-motor nerve paralysis. In this latter case, as well as in the case of neuralgia, the beneficial effect probably depends on the nervous tissue being rendered more vigorous and strong, more able to resist injurious influences. On the same principle we must explain the protection conferred upon the system by the use of quinine in respect of malarious miasms. The protected system resists a poison it would otherwise succumb to. Such facts as these show positively that quinine is not an antiperiodic merely, as some are in the habit of calling it."

Prof. Z. Pitcher, University of Michigan, maintained the following before his class:—

[1] British Med. Journ., Dec. 17, 1859.

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"However the process may be explained, whether on the supposition that it enters the circulation, and as an hæmatic affects the blood, or as a neurotic expends its force upon the nerves of organic life or excito-secretion, there is no doubt of the fact that it in some way accelerates the action of certain of the elementary tissues; as in the skin exciting sudoresis, in the bronchial membrane producing a copious expectoration when the obstruction is congestive, in the genitalia of the female acting under analogous conditions as an emmenagogue. It also puts a limit to certain forms of phlegmonous inflammation, checks the effusions resulting from inflammatory action, and promotes their absorption, whether deposited in cavities or into the areolar tissues, when they have taken place."[1]

Dr. Jno. S. Wilson,[2] of Grimes Co., Texas, regards quinine chiefly as an equalizer of the circulation, and the most potent of all remedies for restoring the nervous and vascular equilibrium. Hence its value in active traumatic hemorrhage, by counteracting congestion; hence, also, its value as an emmenagogue. In tetanus it acts by restoring the nervous equilibrium, in his opinion.

Dr. Wilson's view would readily explain the alleged action of quinine in reducing the volume of the spleen.

The ingenious English therapeutist, Headland,[3] notices the chemical similarity between quinine and taurine, one of the bile products. He observes the prevalence of hepatic derangements in malarial diseases, which suggested to him, that the medicine acts by supplying a deficiency of this product, and restoring the lost equilibrium. The recent discovery of Bence Jones, presently to be noticed, he thinks confirmatory of the idea suggested in his previous edition. He adds that quinine is not necessarily excreted from the system, and instances the experiment of Dr. W. Herapath, of Bristol, who administered ℈ij to a patient in twenty-four hours, and discovered less than 8 grains in the urine during the same period. He presumed that the rest was assimilated, or destroyed *in transitu* in the vascular system, without observing that the elimination by the kidneys might continue several days, and besides be aided by the skin and bowels.

In 1865, Dr. Bence Jones,[4] in experimenting upon the fluorescent phenomena of different chemical substances in the various animal

[1] Peninsular Journ. Med. (Detroit), Oct. 1857.
[2] New Orleans Med. and Surg. Journ., Nov. 1867.
[3] Action of Medicine, 2d Am. ed., 1867.
[4] Med. Times and Gaz., Aug. 18, 1866.

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tissues, by means of electrical light, satisfied himself of the discovery, in all the tissues, of a substance behaving like quinine. This he termed *animal quinoidine.* He continued his experiments by administering quinine to guinea-pigs, and then observing the degree of fluorescence, he found that it had entered all the structures in fifteen minutes, and that its effects disappeared in seventy-two hours. These are his speculations upon the therapeutical action of quinine:—

"The incoming quinine causes a temporary excess of quinine in the textures. Probably it causes a stoppage of the fresh formation of quinine from albumen, a temporary arrest of the changes going on; a transfer of action probably to the quinine introduced, so that with large doses deafness is produced, with great prostration and almost imperceptible pulse, in man, whilst in guinea-pigs death even is produced by the extreme prostration. In small doses quinine probably, like alcohol, gives an immediate stimulus, when the first chemical action takes place; but soon the quinine retards the chemical changes in the nitrogenous substances, just as alcohol, by its secondary action, retards the secondary changes in the hydrocarbons in the different textures. Assume that a substance like quinine exists, during health, in the textures, can its rapid destruction and removal, through the action of marsh miasm, give rise to ague? Does quinine cure ague by furnishing a substance which retards the changes which go on in the textures? and in the well-known property of arsenic to preserve organic substances, have we also the explanation of its power in curing?"

The experiments of Dr. Chalvet,[1] of Paris, have confirmed the existence of quinoidine in the animal textures, and he finds it to disappear in acute febrile diseases. He does not, however, believe it to be formed from the albumen of the blood, but shows that it pre-exists in the food, especially in vegetables and wine. Its disappearance in fevers is therefore due to an arrest of nutrition, and not to its more rapid destruction.

If we admit, with these experimenters, that quinine gains ingress to the organism like iron, and like it cures by supplying a deficiency, quinine should prove fully as certain a remedy for the miasmatic fevers as iron is for anæmia; but experience does not justify such a deduction. It is found that continued use impairs its therapeutic action, which is regained by a period of disuse.

[1] Lancet, May 16, 1868.

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The notions of Headland would imply that quinine acts essentially upon the functions of the liver, and that taurine, the chemical analogue of quinine, is deficient in the subjects of malarial fevers. Evidence of such facts is not adduced by him, nor is it to be gathered from the investigations of others.

These writers, who urge that quinine cures agues by restoring lost constituents to the blood, should explain how the same agent operates in arresting periodical neuralgias and the persistent pains of acute rheumatism and yellow fever, the two latter of which never, and the former not uniformly, can be attributed to paludal miasm. The same explanation is required of Prof. Stillé, and also how he accounts for the failure of its antidotal property after long use.

Prof. Salisbury attributes to various eliminations the chief agency in arresting miasmatic fevers, and to quinine only tonic and restorative properties. He surely overlooks the fact that the most experienced practitioners trust to quinine and leave elimination chiefly to nature. The most vigorous eliminative treatment, to the neglect of quinine, would offer a poor resistance to tropical fevers.

If we are to conclude, from the experiments of Dr. Binz, that quinine acts as an antizymotic, or a destroyer of organic germs, the bichloride of mercury and permanganate of potassa would confessedly supersede it, as more efficient agents. The use of the alkaline sulphites was introduced by Dr. Polli, of Milan, in 1857, and strong hopes have been entertained, on theoretical grounds, that they would prove efficient in the treatment of malarial fevers. These hopes have not been realized, and the writer has been convinced, from actual trial, that they cannot be relied on.

Other quotations herein presented under this head serve to illustrate the diverse opinions entertained by writers upon the *modus operandi* of quinine, on which particular comment would be rather tedious than profitable. On the whole, the writer regards the views of Prof. Wood as most consonant with its obvious physiological phenomena, and with its acknowledged applicability to various maladies hereafter to be noticed.

Though we are satisfied of its absorption into the animal fluids, and willing to admit the fluorescent manifestation which it confers on all the tissues, the weight of testimony is in favor of its elimination mainly, if not completely, from the system. Its promotion of the digestive functions in small doses and its marked effects on the nervous system in large ones, are too palpable for dispute. In

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its progress through the organism it manifests the properties of a local stimulant, with a special action upon the nervous centres; upon that incomprehensible but well-known property of selection, confining its influence mainly to the portions which supply the organs of special sense, especially that of hearing, and preside over the circulation of the blood. A tendency to sanguineous congestions is known as the leading symptom in the cold stage of miasmatic fevers, which we can best explain by reference to disordered nervous action. From the testimony of the pulse, we infer that the effect of small doses, and the primary effect of large ones, is stimulant; while large ones produce secondarily the ordinary effects of other stimulants, manifested by derangement and depression of function. This view alone can satisfactorily account for its general febrifuge properties, which are exercised temporarily even in the specific continued fevers, when it is pushed to the point of sedation, and explain its power of suppressing many of the neuroses, both those periodical and those constant in character.

Another argument in favor of its dynamical rather than chemical action, is the fact that most persons gradually become insusceptible to its therapeutic effects from continued use, which could not be the case if it acted as an antidote. In this respect it resembles opium and other medicines acting upon nerve substance; and, like them, its efficacy is regained by a period of disuse. Besides, cases of intermittent fever occur, which are quite intractable under cinchona and quinine. Such writers as Sydenham, Morton, Grant, Huxham, Ramazzini, Stott, Pierre Frank, Schultz, Hoffman, Pitcairn, Fodéré, Hufeland, and Bretonneau bear witness of this fact.[1] Moreover, other agencies essentially dynamical, and by no possibility capable of chemical action, often exert a similar power in interrupting paroxysmal complaints. Such has been the effect of strong mental impressions, as intense preoccupation of the mind by the passions of fear and anger, and by intellectual labor, or the expectation of cure from such harmless agents as infusion of corn meal and globules of sugar. A narcotic dose of opium and alcoholic intoxication have been equally successful; and such diffusible stimulants as ammonia and ether exert a temporary effect upon a paroxysm. The same may be said of chloroform, under whatever head we may class its agency.

[1] Ronzier-Joly, op. cit.

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THERAPEUTIC APPLICATION.

A.—AS A TONIC.

It is to be observed that Prof. Hughes Bennett[1] questions the tonic properties of quinine, and that Dr. Monette denied them altogether.[2] Trousseau and Pidoux believe cinchona superior to quinine as a tonic; while Wood and Waring attribute all the tonic and febrifuge virtues of bark to its alkaloids.

Dr. Wood does not regard quinine superior to the other tonic bitters in simple dyspepsia; but superior to all others in general debility, since it acts not only locally upon the nutritive functions, but also on the nervous centres, and through them on all the organic functions.

In the profuse suppuration from extensive inflammation, scrofulous abscesses, phlegmonous erysipelas, purulent infection, metastatic abscess and pyogenic fever, and in the later stage of confluent smallpox, it manifests its pre-eminence. In excessive discharges, such as colliquative sweats, bronchial and vesical catarrh, enuresis, diarrhœa, and passive hemorrhage, cinchona is probably superior, by virtue of its astringency; but if the stomach were too delicate for bark in substance, the astringency might be secured by the addition of tannin or the mineral acids.

As anæmia is usually joined with feebleness of the nutritive functions, quinine is obviously indicated, and may be combined with some appropriate ferruginous preparation.

In anthrax, hospital gangrene, gangræna oris, and malignant sore throat, in conjunction with the proper local treatment, it is beneficial by its general tonic properties, and especially its stimulation of the depressed nervous centres. Equally and similarly useful is it in the advanced stages of low febrile diseases, such as typhus, typhoid, petechial, and scarlet fevers, dysentery and typhoid pneumonia, as an adjunct to the diffusible stimulants and opium, which it surpasses in permanence of action.

In cachectic diseases, such as scrofula and consecutive syphilis, quinine is useful in conjunction with the appropriate alteratives, iodine, mercury, and arsenic; and also in chronic cutaneous diseases, such as impetigo, ecthyma, and rupia.

[1] Dunglison, New Remedies, 1856.

[2] See page 587.

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Prof. Wood considers it specially indicated in the course of febrile complaints on the recurrence of cold night-sweats, and in acute rheumatism, when marked by profuse diaphoresis. He supposes that its power in reducing the enlarged spleen is not direct, but through its tonic action on the general system, and the blood-making apparatus in particular.

In chronic malarial poisoning, a prevalent army complaint in malarious districts, the continued use of moderate doses of quinine, combined with iron in case of anæmia, is regarded by Asst. Surg. Woodward, U. S. A.,[1] as the efficient remedy.

In epidemic cerebro-spinal meningitis, Prof. J. S. Jewell, of Chicago, in his monograph on this subject published in 1866, remarks:—

"A few observers have found this remedy [quinine] beneficial, and especially in paludal districts in this country and Europe. . . . On the whole, it seems to be useful as a stimulant only in those cases complicated with malarial disease, and at an early period; or as a tonic at the close of the malady, after the mind is clear and febrile symptoms have disappeared."

Stillé observes that, though this disease is markedly remittent, its use has not been successful.[2]

In scrofulous ophthalmia, it is highly recommended by Mackenzie and Von Ammon.[3] In syphilitic opacity of the cornea, it is used in combination with hydrarg. chlorid. corrosiv., by Dr. C. Beard, of New Orleans.

B.—AS AN ANTIPERIODIC.

This was the first use of cinchona as a remedial agent, and is the most important of the various applications of quinine. No other remedy at all comparable with it in efficacy has been discovered for intermittent fever, and in this disease, it enjoys almost the character of a specific. It is true that, in rebellious cases characterized by frequent relapses, it appears to lose its efficacy; but by alternating with other remedies, as arsenic and salicine, susceptibility to its influence is regained.

The value of cinchona in intermittent fever having been established, it was natural to extend its application to other periodic

[1] Outlines of camp Diseases, 1864.
[2] Op. cit.
[3] Dunglison, New Remedies, 1856.

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maladies, and in these, it had a pretty wide range of use before the discovery of its alkaloids. The superior eligibility of quinine has brought within its scope nearly all diseases of a periodic type, which are idiopathic. Those which are sympathetic, as hectic, hysteria, and epilepsy, are not generally amenable to this remedy, because dependent on a permanent source of irritation, though they may sometimes temporarily be arrested.

The coëxistence of inflammation does not forbid its use, for the recurrence of febrile paroxysms would aggravate this more than the remedy would, unless its seat were the brain or its envelopes.

The tendency of functional nervous complaints to assume a periodic type is well-known, and the power of quinine to break up the morbid habit is equally acknowledged. This is especially the case where malarial influences prevail, which tend strongly to give a degree of periodicity to all febrile and nervous diseases. They are then curable by the great antiperiodic, in proportion to the degree of periodicity. Among the most common of these nervous complaints may be mentioned facial neuralgia and headache, the former affecting particularly the orbital regions, and the latter assuming the form of hemicrania. When these attacks can be traced to miasmatic influence, they yield readily to quinine; and even when such a cause cannot be suspected, if they are plainly periodic and regular, this remedy is indicated. Periodic nervous affections originating in the brain or affecting the special senses, are liable to be attended with congestion of these nervous centres, which might be aggravated by quinine.

In similar affections of the respiratory organs, as asthma, the convulsive cough of bronchitis and influenza, and laryngismus stridulus, it is both appropriate and efficient in a large proportion of cases. Prof. H. N. Eastman, of Geneva Medical College, recommends quinine highly in croup, whenever it manifests a periodically paroxysmal tendency. To a child of one to two years he gives gr. x in divided portions within four hours of the expected recurrence. In a few cases, which had assumed a continued form, with uninterrupted dyspnœa and fever, he succeeded in arresting the disease. He also successfully treated an adult case of acute laryngitis with periodic exacerbations of dyspnœa, using only gr. xij in divided doses.[1] A medical friend of the writer, of large experience, has also found it effective in intermittent hiccough and colic.

[1] N. Y. Journ. Med., Sept. 1859.

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The prevalence of miasmatic influences in tropical countries, and in the recently and sparsely settled alluvial districts of the temperate zones, gives a preponderance to fevers of the periodic type. The same cause tends to give the specific continued fevers, and a large proportion of the symptomatic fevers, within these limits, a paroxysmal complication, an element which demands the use of quinine. Thus there is a form of dysentery, characterized by a rapid succession of bloody stools with tormina and tenesmus, followed by a period of repose, the attacks recurring daily or every second day about the same hour. Pneumonia also is liable to regular exacerbations, marked by pulmonary congestion, with dyspnœa, and followed by febrile reaction. So common is this complication, that in the recent medical literature of the Southwest one may notice a disposition to refer pneumonia and intermittent fever to the same cause. It is within the last seven years that a remarkable case occurred under the writer's observation, of an intermittent running through all the stages of pneumonia and terminating in gangrene of the lungs and death. The character of the disease was not mistaken, but the subject was an old man of intemperate habits, whose stomach persistently rejected quinine. The congestion of the cold stage, in this case, had its seat in the chest rather than in the abdomen, as is usual, and the consequences were therefore more rapidly disastrous.

Prof. T. D. Mitchell, of Transylvania University, asserts the following: "The fevers of the United States are essentially periodic, and if you would treat them successfully, the doctrine of periodicity must not be forgotten." He claims to abort typhoid fever by the early use of large doses of quinine, and believes that nine-tenths of the cases could be cured in the first week. He does not recognize the sedative action of quinine in large doses, and obviously relies on its anti-periodic property.[1]

Dr. J. C. Cameron, Deputy Inspector-General of the British forces in India, insists on a periodic type characterizing nearly all tropical diseases, and the efficacy of quinine in their treatment. He specially instances dysentery as an example.[2]

While fully assenting to the prevailing tendency of diseases to this complication within the sphere of malarial influence, and the corresponding usefulness of quinine, the writer does not assent to the tractability of typhoid fever under antiperiodics. Professor

[1] N. Orleans Med. and Surg. Journ., July, 1846. [2] Lancet, Nov. 9, 1861.

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Mitchell's cases were probably malarial fevers of a remittent or continued type, taking on a typhoid character, but without the distinctive lesion of dothinenteritis. It is to be observed that this last is much less common in malarious regions than elsewhere, but whether an antagonism exists between the febrile poisons, who can say?

In diseases distinctly *remittent* in character, quinine manifests scarcely less power as an antiperiodic. This is especially true of the miasmatic or bilious remittent fever, which prevails so extensively in the Southern and Western States along the watercourses, and the sea-coast as far north as Norfolk. Its use in this form of malarial fever, particularly when approaching a continued type, is comparatively of recent date. Since it has been discovered that it is not necessary to wait for a complete subsidence of the febrile movement, it has become the main reliance in the treatment of these fevers, and in many instances is the remedy resorted to.

Its applicability to the neuroses is the same in the remittent as in the intermittent type, with some distinctions as to time and mode of administration, hereafter to be noticed.

C.—AS A SUPERSEDENT.

The mode of action of quinine as a supersedent is similar to that under the preceding head. Its application, however, is very different, and under this head it is adapted especially to the neuroses. The term is significant of the mode of action, which is by exerting a more powerful impression on the nervous centres than the disease itself, and thus in reality effecting "an elimination by substitution."

For this purpose enough of the remedy is to be given to produce a decided impression, which must be sustained for a length of time proportioned to the severity and natural duration of the complaint. Thus it has been found efficacious in irregular and persistent neuralgia, hysteria, chorea, spasmodic asthma, the advanced stage of pertussis, spasmodic croup, functional epilepsy, and even in idiopathic tetanus. In the last disease, successful results have been obtained by Malone, of Florida; Bishop, of Ithaca, N.Y.; Firna, of Milan; Cock and G. O. Rees, of England; Gleizes and Briquet, of France.[1] A case of recovery from traumatic tetanus in about

[1] Stillé, op. cit.

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a fortnight, under this treatment, has been reported by Coste, Chief Surgeon of Hôtel Dieu, at Marseilles.[1]

In nervous headache Prof. Wood uses it combined with oil of valerian; MM. Debout and Serres, with digitalis.

D.—AS A SEDATIVE.

This use of quinine is applicable to diseases of over-excitement not connected with active congestion, inflammation, or peculiar excitability of the brain. It is thus extensively and successfully employed in the Western and Southwestern States, and in British India and Guinea, in the treatment of bilious remittent fevers, without waiting for a remission. As we shall hereafter see, practitioners give it in large doses in any stage. When given during the hot stage, its action is probably threefold: 1. As a sedative, it subdues arterial excitement; 2, as a supersedent, it supplants the miasmatic disorder; 3, as an antiperiodic, it prevents a return of the paroxysm. In this application it is adapted to miasmatic fevers without distinct remission; and especially to the pernicious form marked by grave disturbance of the nervous centres, other than active congestion. Practitioners familiar with the severer forms of malarial disease are now agreed upon the propriety of this practice and its superiority to every other; so that this point may now be left, to discuss at more length the use of quinine as a sedative in acute rheumatism and the non-miasmatic specific fevers.

(*a*) In *acute rheumatism* cinchona was early a favorite remedy, in large doses, among British practitioners, and was extensively used by Richard Morton, Hulse, Saunders, Fordyce, Fothergill, and afterwards by Haygarth, on account of supposed analogies between ague and rheumatic fever. With it they joined the use of cathartics, diaphoretics, and venesection. This practice was opposed by Scudamore, and subsequently went into disuse, for the art of healing has its fashions, as well as the art of dressing.

Latterly it has found favor in France, and M. Briquet has had great reputed success, claiming to have cured violent cases in two or three days with 3j–iss in 24 hours; but he and others have found patients to succumb with meningitis, adynamic symptoms and collapse, attributable to the remedy. MM. Andral, Monneret, Legroux, Trousseau, and Pidoux have also experimented with it;

[1] Lancet, Am. Repr., August, 1851.

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the two latter in moderate doses and without the disastrous results mentioned by Briquet. The French Academy thought the subject worthy of their investigation, and appointed a committee, which reported adversely to the large doses employed by Briquet, and declared that all the beneficial results could be obtained from smaller ones.[1]

Prof. Dunglison[2] regards acute rheumatism as a neuropathic disease, in a great degree, and has found much benefit in the use of quinine—℈j–℥ss in 24 hours.

Prof. Stillé considers bark more efficient than quinine in this disease, and would premise its use by depletives and evacuants.

Prof. Wood does not approve of quinine as a sedative in acute rheumatism, unless complicated with malarial poisoning; but in cases of debility with profuse sweating he uses it as a tonic.

The following are Monneret's conclusions on this subject:—

"(1) The sulphate of quinine exercises an incontestable influence on the local symptoms of rheumatism, and especially the pain. (2) In a very small number of cases, this action is lasting and efficacious; generally it cures rheumatism neither more surely nor rapidly than many other proposed plans of treatment. (3) It does not prevent the development of endocarditis. (4) It does not enjoy any evident antiphlogistic property."[3]

M. Legroux[4] maintains that the quinine treatment is the most speedy in its effects; that the pain and fever yield with remarkable promptness; that the blood becomes less buffy, without resort to any other medication; that endocarditis is less frequent than with other modes. He observes, however, that relapse in rheumatism is not rendered less frequent under this plan.

The following is the method of Trousseau and Pidoux:—

"We give, as MM. Briquet and Legroux, the sulphate of quinine several days in succession, one, two, and sometimes three *grammes* in eight or ten doses in 24 hours. We continue thus two days after the pains and fever have ceased. Then for two or three days we give only one *gramme* a day; then one *gramme* in two days for two weeks or less, while the patient begins to eat and go out. In this way relapse is almost certainly obviated.

"This medication is chiefly suited to individuals of lymphatic temperament, naturally delicate or incidentally debilitated by pre-

[1] Dunglison, op. cit., from Med. Exam., July 8, 1843.
[2] Dunglison, op. cit.
[3] Trousseau et Pidoux, op. cit.
[4] Journ. de Med., 1845.

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vious sickness, or venesection which had failed to check the progress of the rheumatic inflammation. One of the surest conditions of its success is, that the articular lesions be multiple, superficial, and migratory. On the contrary, this medication has less efficacy in subjects of plethoric habit, who present a very intense inflammatory aspect, with a pulse hard, full, and strong; and in those who have a great nervous susceptibility and a predisposition to cerebral congestions and hemorrhages. It is especially of little avail, if the rheumatism is mono-articular, or affects but few joints, and if the lesion is fixed, intense and characterized by the signs which indicate an arthritis with considerable effusion."

Dr. Niemeyer, Prof. of Pathology at the University of Tubingen, writes on this subject as follows:[1]—

"As to quinine, it has, doubtless, as little specific virtue against acute articular rheumatism as against pneumonia, typhus, and many other maladies, in the treatment of which, nevertheless, it plays a very important part. But it constitutes one of the most powerful antiphlogistics, and for this reason deserves to be employed equally in acute articular rheumatism where the fever attains an extraordinary intensity. Patients generally have to take from one to two *grammes* of quinine a day, and it is proper to prescribe pretty large doses; for I am convinced, in common with others, that we cannot expect any effect upon the temperature or pulse without."

In Reynolds' *System of Medicine*, Dr. Garrod speaks highly of the quino-alkaline treatment of rheumatism. Each dose contains gr. v of quinine and ʒss of carbonate of potassa rubbed up with mucilage and an aromatic, given every four hours. It diminishes the frequency, but not the force of the pulse, and is not contraindicated by cardiac complications. Prof. Bemiss, Univ. La., informs the writer that he has practised this plan with great satisfaction, after the more inflammatory symptoms had abated, and especially when there was much sweating. He thinks that the pain is thereby greatly alleviated, and the malady more readily conducted to a favorable termination.

It is hardly necessary to remark that the treatment of acute rheumatism by alkalies is much in favor at the present time, and consideration is due to the part played by the alkali in this plan of treatment.

M. Beau,[2] at Hôpital Cochin, Paris, treats acute rheumatism

[1] Elements of Internal Pathology and Therapeutics.

[2] Med. Times and Gaz., Oct. 29, 1859.

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with quinine, gr. ix–xviij every eight hours, premising this course by copious vomiting and purging with tartar emetic. In the cases reported, the quinine treatment was continued twelve to fourteen days.

At this time the quinine practice in acute rheumatism is not much in favor outside of France, and has failed there to fulfil the sanguine expectations of its advocates twenty-five years ago. The physiological effects and mode of action which we find to characterize this remedy, would indicate its efficacy to a certain degree. Its diaphoretic property might aid in the elimination of the morbid product peculiar to the disease; its sedative action would diminish arterial excitement; and the powerful impression made upon the nervous centres would render them insensible to the inflammatory process. But all these effects could be produced by other agents less hazardous and expensive, and the writer is inclined to deny to quinine any power to counteract the *materies morbi*, and to rank it very low as an eliminative agent. On the whole, therefore, he does not consider it, under ordinary circumstances, a valuable remedy in this disease, except as a tonic towards the close of a debilitating attack.

(*b*) In *gout*, large doses may suppress the febrile movement, and even modify the local inflammation; but they fail to eradicate the disease, which is very liable to reappear in another seat.

(*c*) Cinchona was introduced as a remedy for *typhus* in England by Dr. Miller, in 1770, and subsequently was recommended by Dr. J. Clark.[1] Sydenham did not use it in continued fever; but his contemporary, Morton, used it boldly, giving ʒj every three or four hours, and claimed great success. Dr. Huxham gained "excellent results." Dr. Sims wrote thus: "I solemnly declare that I never saw a case of nervous, low, putrid, or malignant fever, when the patient could be brought to take this medicine in sufficient quantity, turn out unfortunately." He did not rely on less than six or seven ounces, given in about two days. Drs. Fordyce, Armstrong, and others were of a different opinion.[2]

Dr. Robert Dundas, of Liverpool, has been one of the strongest advocates in our day of the quinine treatment in continued fever. The following is a synopsis of his views, which are sufficiently clear and decided:—

"(1) Ague and remittent fever do not originate in malaria, or marsh poison. (2) Intermittent, remittent, and continued fever are

[1] Waring, op. cit.

[2] Lancet, Am. repr., Sept. 1853.

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mere varieties of the same disease. . . . . By the same agents we can arrest them all. . . . . (4) Bark duly administered will generally arrest the intermittent and remittent fevers, and typhus fever being essentially the same disease bark ought to, and generally will arrest it. . . . . (7) The administration of large doses of quinine in typhus, when not curative, is never followed by the slightest ill-effects."[1]

Propositions (3) and (5) are here omitted, as not essential to the illustration of this subject.

At the suggestion of Dr. Dundas,[2] quinine was employed at the Liverpool Fever Hospital, in cases which appeared to be distinctly idiopathic. It was given in all stages, unless there was great prostration, in doses of gr. ij–x every two or three hours, in powder. The effect upon the pulse, in favorable cases, was sometimes very remarkable, but generally the reduction was gradual and steady. In complicated cases, the effect was less marked, and in fatal cases, with one exception in those under observation, the pulse did not fall below 100 beats to the minute. Of 88 cases in which this treatment was used, 27 were complicated with chest and abdominal affections, and 61 were uncomplicated. Thirteen were fatal, giving a mortality of nearly 15 per cent.

The success claimed by Dr. Dundas, was confirmed by Eddowes, Steele, Gee, Stevenson, Glassbrook, Lister, and Gildersleeve, all of Liverpool, and by Fletcher, of Manchester. At Edinburgh, the decision was adverse.[3]

Prof. Bennet, in a trial with seven cases at the Royal Infirmary, Edinburgh, found that quinine did not cut short the fever, nor produce any amelioration. Dr. Christison used it in one case, and Dr. Robertson in eight, with the same result.[4]

Dr. A. W. Barclay, Med. Registrar, St. Geo. Hospital, gives the result of the quinine treatment in 1852, from the middle of May to the middle of Nov., generally in ten-grain doses every four hours. He says, "I am sorry to be convinced that it has no advantages."[5]

In the Crimean war, where this treatment in typhus was extensively used, the results were unsatisfactory.

Dr. Waring is of opinion that quinine has no power to cut short typhus or typhoid fever, nor any good effect upon either, beyond that of a tonic.

[1] Am. Journ. Med. Sci., Oct. 1852.
[2] Lancet, Am. repr., Sept., 1853.
[3] Stillé, op. cit.
[4] Am. Journ. Med. Sci., Oct. 1852.
[5] Am. Journ. Med. Sci., July, 1853.

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(*d*) In continued fever [supposed to be the one now known as typhoid] Cullen found that cinchona aggravated the febrile symptoms and induced inflammation of the brain and lungs. From 1840 to 1842, quinine was used as a sedative in typhoid fever at Paris by Blache, Manoury, and Broqua. M. St. Laurens found that doses of ℈j–ij produced marked depression of the pulse; but the tongue became redder and drier, the thirst increased, and vomiting occurred with epigastric pain and sometimes diarrhœa. In 1843, the French Academy, on motion of Louis, resolved that the utility of quinine as a sedative in typhoid fever is far from being proved.[1]

M. Briquet maintains that, in large doses, quinine succeeds in subduing headache, nocturnal restlessness, delirium, convulsions [ataxic symptoms], cramp in the neck, etc.; on the contrary, when there are prostration, stupor, coma [adynamic symptoms], quinine aggravates these accidents. He considers it best adapted to cases marked by exacerbations and remissions, and never to cases complicated with inflammation of the alimentary canal. He gives one to four *grammes per diem*, according to the severity of the case, and confines its use to the first eight days; after which it becomes useless or hurtful. His experiments in this treatment of typhoid fever show a mortality of 8 in 43 cases, or about 18 per cent.; and in 4 of these 8 cases there were *post-mortem* signs of meningitis.[2]

J. W. Hayward, Esq., of Liverpool, reports 80 cases of typhoid fever, treated chiefly with quinine. His mode of treatment is described as follows:—

"If I found the pulse quick, weak, and thready; the tongue cracked, brown, and dry (rough or smooth); great thirst and delirium; no appetite; tenderness of abdomen; soreness of flesh, etc., I put the patient on disulphate of quinine in solution at once—four or five grains every two hours. . . . . When ringing in the ears occurred, the quantity was decreased, but still kept up till there was a good appetite. . . . . In 79 cases, marked improvement was observable in twelve hours; the pulse was the first to improve, then the delirium to give way, then the pain in the head, the thirst, the soreness of flesh, tenderness of abdomen, dryness of tongue, and the appetite to improve."[3]

Only three of these cases proved fatal, one of which was not treated with quinine.

[1] Stillé, op. cit. [2] Trousseau and Pidoux, op. cit.
[3] Lancet, Am. repr., Dec. 1852.

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The structural lesion characteristic of typhoid fever would seem to offer a contraindication for the use of a drug like quinine, which often produces serious gastric disturbance and sometimes diarrhœa. Now this last is a common and troublesome feature of the disease, and must be greatly aggravated by an irritant in direct contact with the ulcerated patches of Peyer; nor is it unreasonable to suppose the same agent capable of developing a latent predisposition into an active inflammation.

Assistant Surgeon, Charles McCormick, U. S. A., seems, like Dr. Dundas, to consider quinine a universal febrifuge and applicable to any inflammatory disease whatever.[1] Such enthusiasm savors of extravagance, and tends to bring a valuable remedy into disrepute.

The views of the most prominent advocates of the quinine treatment of typhus and typhoid fevers have thus been presented, together with others decidedly in opposition. Were our judgment to rest upon the numerical results, as given by the partisans of this special practice, we see that it possesses no advantage over the ordinary modes; for where the figures are given, the mortality is in excess of the average. The propensity of mankind to take a magnified view of the merits of any special theory or practice which they advocate, especially if it possesses the charm of novelty, obtains in medicine as in politics and religion; and physicians, like other men, anticipate with pleasure the perpetuation of their names in connection with important discoveries. The intelligent observer, who is removed from personal bias and private interest, can estimate such claims at their just value, and so have the profession at large on this point: their decision is adverse.

The tendency of most febrile maladies to assume a periodic type in malarious districts strongly applies to these fevers; but this fact does not indicate the sedative use of quinine, though as an antiperiodic it may often be useful. Even with this view one is liable to fall into error, as the writer has had occasion to observe. In the summer of 1862 he was ordered to duty in the Military General Hospital at Lauderdale Springs, Miss., a location redolent of paludal miasms. Typhoid fever had been very prevalent and fatal for several weeks, and a tendency to daily excerbations had led to the free use of quinine. The results were so unsatisfactory that this practice was wholly abandoned shortly before the writer's arrival.

(*e*) In *yellow fever*, cinchona was recommended by Lind in 1777,

[1] New Orleans Med. and Surg. Journ., Nov. 1845.

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as a remedy for the advanced stage, and about the same time by others as a prophylactic. Rush, Bayley, and Currie tried it in New York and Philadelphia, but condemned it as injurious. Lafuente and Bobadilla, in 1800, proclaimed it as a specific, when used early, and it was largely employed by Spanish and French physicians of that time, but afterwards lost its reputation as a curative agent.

In 1821, soon after the discovery of quinine, the sulphate was used in the early stage of this fever at Barcelona, by Audouard, but unsuccessfully. Previously to 1826 it was used in the same way by Dr. Daniell, of Savannah. In the year last mentioned, Lefort, of Martinique, who observed an analogy between this and remittent fever, gave it in two or three grain doses every two or three hours, on the appearance of a remission, and was delighted with its effects. Dr. Chevé used large doses in the epidemic of 1830 in Senegal, after producing a remission by bleeding, revulsives, etc.[1]

In 1837 Thévenot of Guadeloupe, and Blair of Demerara, proposed quinine as a specific in yellow fever.[2]

The latter, Dr. Daniel Blair, Surgeon-General of British Guiana, wrote a history of the epidemic, which broke out in that colony in 1837. Speaking of treatment, he says :—

"When a medical practitioner was called to a case of yellow fever in the formative stage (for the practised eye could even then discover its existence), or within a few hours after the development of the first stage of the disease, if he prescribed gr. xx of calomel and gr. xxiv of quinine, and in six hours followed it by a dose of ℥iij of castor oil, he would, in perhaps nine cases out of ten, immediately arrest the disease. If the disease did not yield to the first dose, the calomel and quinine were to be repeated every six hours, as long as there was no contraindication, and as long as the first stage of the disease lasted. . . . . Its success was in proportion to the earliness of its use. Very early in the first stage, it might be designated a specific, I believe. I have never had occasion to prescribe more than six such doses to any one patient, and I have no recollection of ptyalism ever having followed its use. . . . . It is necessary to state that there was one drawback to the calomel and quinine cure—the cure by resolution—viz., that it still left the

[1] La Roche on Yellow Fever, 1855, vol. ii. p. 715.
[2] Stillé, op. cit.

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patient liable to another attack, unless he removed from the malarious district."[1]

The editor of the volume referred to, Dr. John Davy, Inspector-General of Army Hospitals, etc., remarks in a note as follows:—

"The above mode of treatment by quinine and calomel, which appears from the accounts of the author to have been so successful in the yellow fever he describes, was tried in the last endemic yellow fever of Barbadoes, and extensively; but, I regret to state, not with like success. . . . . It is possible that the difference of effects of the quinine and calomel plan of treatment in Demerara and Barbadoes may have been owing to the yellow fever in the former locality having been modified by the malarious influences productive of remittent fever, an influence in that malarious country affecting almost all diseases, and seemingly indicated by the train of symptoms of the yellow fever, especially the earliest—the alternation of chills and heats."[2]

In speaking of the fevers of the West Indies, the same writer states:—

"It may be inferred that, in Jamaica, as in British Guiana, yellow fever, even when most malignant, has more of the remittent fever complication than in Barbadoes."[3]

He does not attempt to account for this difference between Barbadoes and the other two colonies, but it is reasonably attributable to the fact that the small island is densely populated, is in a high state of cultivation, and is completely swept by the sea breezes.

In New Orleans, Dr. Halphen is said to have been the first to use quinine in the early stage, in 1837.[4]

The late Prof. Harrison, University of Louisiana, on this subject writes:[5] "This mode, so far as I know, was first put in practice by Dr. J. M. Mackie, of this city, who adopted it at the suggestion of Dr. Thomas Hunt, also of this city. Dr. Hunt was led to believe in its efficacy from a review of the writings of Maillot, published in the July number, 1839, of the *British and For. Med.-Chir. Rev.* . . . . With regard to the manner in which quinine acts to produce such effects, no doctrine of stimulants, contro-stimulants

[1] Some Account of the Last Yellow Fever Epidemic of British Guiana, 1852, pp. 108 and 109.

[2] Blair, op. cit., p. 109.

[3] Op. cit., p. 147.

[4] La Roche, op. cit., vol. ii. p. 715.

[5] New Orleans Med. and Surg. Journ., November, 1845.

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or sedatives can reach the explanation. Nothing that we know of can be substituted for quinine; its effects are therefore specific, and are owing to its chemical character. I believe that it acts, like the poison of which it seems to be the antidote, directly on the nervous substance, breaking up the whole condition upon which the morbid actions depend, but in a manner perfectly inexplicable in the present state of science. If there be any way of cutting short an idiopathic fever, it is assuredly to be effected by quinine. But there are certain facts which lead me to believe that the disease under consideration runs its course, even after all febrile symptoms have succumbed to the power of quinine, and indeed after all morbid symptoms whatever have disappeared. In 1841 I lost a patient, and in 1842 another, one on the sixth, the other on the seventh day, in whom the fever had been cut short as usual by the administration of quinine. They lay in bed for two or three days without a single symptom of the disease, yet they both died with black vomit. . . . .

"When in the commencement there is great congestion of blood in the brain or any other important organ; or when the fever supervenes upon chronic inflammatory diseases, I would most certainly resort to other means. Nor would I be understood as speaking of quinine as an infallible remedy. The practitioners to whom the disease is a new one, will soon discover that, in certain cases, particularly in those of the congestive and ataxic types, quinine is as inefficacious as any other remedy. In cases in which the fever is well and fully developed, it will unquestionably cut that fever short, and thus prevent the formation of those local congestions which are produced by the febrile action. In this consists its value, and assuredly it is a great one."

The plan was to give a dose of ℈j–iv without waiting for any abatement of fever, but as soon as possible after the attack. If the first dose failed to produce an apyrexia, a second was given in eight or ten hours, but never after the second day.

The late Prof. Wedderburn, University of Louisiana, and the late Prof. Fenner, New Orleans School of Medicine, were enthusiastic about this remedy, which they used in twenty or thirty grain doses, and styled the treatment *abortive*. It appeared to be successful in 1837 and 1839, but less so in 1841, when there was a more violent epidemic. From 1847 to 1853, Dr. Fenner found the fever to yield to large doses at the onset, but in the latter year he abandoned it, remarking: "Candor requires me to state that this

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abortive practice did not answer my expectations, and after giving it a fair trial I abandoned it, and fell upon a milder course of treatment, which proved more satisfactory."[1]

After the close of the same epidemic, Dr. Anderson, of Mobile, wrote of the practice generally pursued by the physicians of that city as follows:—

"They used quinine in almost every case, regardless of age, sex, idiosyncrasy, or any other circumstance. They have reason to be pleased with their manner of treatment, and with their present experience would not exchange it for any other that they have heard of."[2]

Dr. Bennet Dowler, then editor of the *New Orleans Medical and Surgical Journal*, remarked after the close of the epidemic of 1853, that large doses of quinine could not be relied on that year. It was early tried, and then for the most part abandoned.

On the use of quinine in yellow fever, Professor Warren Stone, of New Orleans, wrote in 1854:—

"My experience is, that all systems of active perturbating treatment are about equally successful, or rather equally unfortunate. Another system has for its general features the expectant plan, with the addition of the use of quinine in the early stage.

"Although this may be termed a system of treatment, there are a variety of methods of administering quinine. Some give it in large quantities, without qualification or preparation; some endeavor to obtain a remission, which can almost always be done, if the patient is seen early; and some are very timid in its use, and would do better not to give it at all. I have used it for the last seventeen years, and have made but little alteration in my method since 1837. If I see the patient early, or in the forming stage, I am in no hurry to administer the quinine. The stomach is often full; the patient may vomit, or may require a dose of oil, or something to evacuate the bowels, which can be given with a hot foot-bath, and afterwards the quinine, in quantity sufficient to put the patient fully under its influence; and this may be done either by a single dose, or in two or three divided doses given in a short time: I prefer a single dose, if the stomach will bear it. Twenty grains of pure quinine is enough to put any patient under its influence, and I am satisfied that enough is better than more; although I do not believe in the evil effects of quinine, which some have, in my opinion,

[1] Stillé, op. cit.

[2] Stillé, op. cit.; La Roche, op. cit.

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unjustly and injuriously accused it of. It is unfortunate that men will endeavor to sustain their own peculiar systems by detracting from and throwing odium upon those of others, instead of resting upon their own merit. There can be no doubt as to the great value of this remedy in this disease. Its mode of operation will better explain its value. If given early, it relieves the excruciating pains, even of the head, as completely as in the case of a distinct intermittent neuralgia; diminishes the injection of the conjunctiva; promotes perspiration to profusion; prolongs the sweating stage in a large majority of cases, until the disease subsides; and maintains the integrity of the nervous system, so that the different functions will be but little disturbed. The expectant practitioner will say that can be done in a majority of cases without quinine. I grant it; but quinine, in addition to the expectant treatment, will save ten per cent. more, in my opinion. In 1837 I had four wards in the medical department of the hospital. The patients were admitted in regular turn to each physician, and, of course, in the course of a month the cases must have been about equally favorable; and ten per cent. was the difference in result. I even divided my own wards, two and two, until I was so well satisfied of its advantages, that I felt that I was not doing my duty to neglect to give it in a fair case, and only continued my observations upon doubtful cases, or cases advanced in the disease. The true principle is to administer, early in the disease, sufficient quinine to place the patient under its influence; say from 15 to 25 grains, according to the case, and repeated after some hours, so as to keep up the influence gently. I formerly was in the habit of giving with it either blue mass or a few grains of calomel; but finding, as a general rule, no condition requiring it, I have dropped its use. . . .

"I have said that quinine should be given early, at least as soon as the cold stage has passed, but I never give it in the second or last stage. Some give it after the disease has subsided, and the patient ought to be left alone. Some are too timid to use it in the early stage, when it ought to be used, and finding ordinary means to fail, resort to it when I would not; and some give it in unnecessary and unwarrantable doses from beginning to end. Is it strange that quinine has its opponents? I am as strong an opponent of such use of it as I have seen, as any one; but because a thing may be abused, should it be discarded? I do not pretend that quinine cures, or cuts short the disease; but it favors the natural termination, and renders cases simple that without it would be dangerous.

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Some cases, I have said, terminate in 24 to 60 hours, under the expectant treatment. With the early use of quinine, a great many more cases would have this termination. These cases, however, have to be kept quiet the usual length of time; for if they are allowed to get up, they become faint; or if they are guilty of imprudence, the disease terminates in black vomit and death, showing that it takes a certain time for the specific poison to work its effects.

"The epidemic of 1853 was the severest in character ever known, and more cases were fatal in their nature, in spite of any management; and all kinds of extravagances were committed in treatment, and many conservatives (perhaps honestly) seized upon quinine, and held it up as the cause of many of the symptoms that belong to the severity of the disease. It was as valuable, in the proper stage, last year as it ever was; but there were more cases in which all means failed to produce the usual favorable effects, than ever known before.

"Many claim the merit of originating the use of quinine. I used it in two or three cases in 1835, but the epidemic of 1837 was the first opportunity I had of giving it a fair trial; and the principles upon which I use it were established that year."[1]

Prof. James Jones, University of Louisiana, avers that the *abortive* treatment certainly subdues the cerebral and spinal pains and the fever in a few hours, and affords great comfort to the patient. In his opinion, however, it serves but to hide the disease, not cure it; and he has always observed that this treatment is followed by an extraordinary number of relapses and prolonged convalescence.

Dr. W. H. Van Buren, U.S.A., reports adversely of its use in Florida in 1841.[2]

The late Dr. C. H. Stone, of Natchez, then of Woodville, Miss., reports his experience with quinine in 1845, in the first visitation of yellow fever at Woodville. He used it rather as an antiperiodic than sedative, on the subsidence of the fever and beginning of the calm stage, and was fully convinced of its bad effects in every case in which it was used.[3]

In the same year Dr. Wederstrandt, Surgeon of Charity Hospital, New Orleans, regarded its use as a failure in that institution.[4]

[1] New Orleans Med. and Surg. Journ., Nov. 1858. It will be observed that the credit of introducing the quinine practice in yellow fever at New Orleans has several claimants, but it is not essential here to decide between them.

[2] Stillé, op. cit.

[3] New Orleans Med. and Surg. Journ., Sept. 1845.

[4] Ibid., July, 1846.

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In the late epidemic of 1867, quinine was early resorted to by many practitioners of New Orleans, chiefly those to whom the disease was comparatively new. No enthusiasm, however, obtained in its use, and, as the season advanced, this practice declined in favor. At the Charity Hospital it was used for the special purpose of subduing the cerebral and spinal pains, so prominent in yellow fever, and this it seemed to effect. As early as possible a dose of gr. x–xv was given, and repeated in two or three hours if necessary. The disease was not generally of an inflammatory type, and its sedative effect was not sought. It is not claimed that the mortality was any less than when quinine was withheld, nor that convalescence was more rapid.

Dr. Charles Deléry, a Creole practitioner of 25 years' standing, has published an account of this epidemic, wherein he makes a declaration generally accepted by his *confrères:* "That the sulphate of quinine is a specific in pernicious [miasmatic] fever, no physician doubts; that it is useless in small portions, injurious in large, in yellow fever, is a fact recognized by all unprejudiced practitioners."

In the same work is quoted the opinion of Dr. Landry, an old and highly respected practitioner of New Orleans: "The sulphate of quinine has absolutely no control over the progress of the malady. I administered it during the first month to nearly all my patients, never exceeding ʒss in twenty-four hours. It often produced vomiting, always cinchonism, never the least benefit. Eventually I abandoned it."[1]

How it could prove injurious in a malady so obnoxious to cerebral and gastric derangements, is easily understood. That the results of this treatment were rather negative than positive, as affecting the rate of mortality, is attributable to the mildness of the late epidemic, while it is important to observe that it has proved disastrous in those previous visitations marked by unusual severity.

It has never been observed here, as by Dr. Blair, in Demerara, that the quinine treatment left one more liable to a second attack than any other. There are those indeed in the profession, who recognize two forms of yellow fever here prevalent, the endemic, which is an annual visitant of a limited number of subjects; and the epidemic, which is occasional and sweeping. How far the

[1] Mémoire sur l'Épidémie de Fièvre Jaune, qui a regné à la New Orléans et dans les Campagnes pendant l'année 1867.

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former type may be modified by miasmatic complication, is undetermined; but it is certain that the epidemic yellow fevers seem to suppress the malarial fevers, which prevail in the city more especially during the very months selected by the former. Whether there are two distinct types or not, it is an argument against malarial complication that quinine is not essential to recovery in either the sporadic or epidemic forms; while it is worthy of remark that the ratio of mortality was greater in the sporadic yellow fever of 1866 than in the epidemic of 1867.

Leaving the unity or duality of this disease an unsettled question, as also its miasmatic complication, it may be asked how we can reasonably expect to arrest a self-limited toxæmic disease by any therapeutic agent; and especially how arrest an asthenic fever by sedative doses of quinine. An agent capable of cutting short continued fevers is a chimera which has haunted many a visionary mind, and occasionally some one fancies that he has grasped it. Quinine has rejoiced in its day of hope and enjoyed the support of able partisans; but its pretensions to universal sway over febrile maladies have not been acknowledged by the profession at large, and in yellow fever, as well as the others, its days of usurpation are probably numbered.

(*f*) In *peritonitis*, both puerperal and idiopathic, M. Beau has been in the habit of prescribing large doses of quinine for its contro-stimulant effect, giving gr. viij–xviij every eight hours. A large blister over the abdomen is sometimes conjoined. The effect claimed is a decided reduction of the pulse, and subsidence of pain and tenderness. He premises its use by an emetic and cathartic, but deprecates bloodletting as increasing the ratio of the fibrine to the corpuscles, and adding to the mischief. The remedy must be pushed to decided cinchonism, and must be continued some days after the subsidence of the inflammatory symptoms, amounting sometimes to eighteen days under this treatment, to prevent relapse, the doses being gradually diminished towards the close.[1] Mr. Handfield Jones, commenting on this treatment, admits its applicability to asthenic cases, but not sthenic.[2] To this the correspondent and reporter rejoins, that the inflammation, in most cases, is essentially connected with a state of asthenia.[3]

(*g*) Dr. W. M. Boling, of Alabama, reports several cases of

[1] Med. Times and Gaz., July 2, 1859.
[2] Id., July 23, 1869.
[3] Id., Sept. 3, 1869.

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pneumonia, in which quinine was given freely and successfully as a sedative, with a marked effect on the pulse.[1]

Under a previous head, allusion has been made to the complication of pneumonia with malarial poisoning, marked by an intermittent or remittent type of fever. It is probable that such was the nature of the cases reported by Dr. Boling. The importance of bearing constantly in mind the liability to this complication in a region where miasmatic fevers prevail, cannot be too highly estimated for its determination upon the treatment. A decided tendency to periodical exacerbation and remissions calls for the interposition of the great remedy, but not as a sedative entirely or chiefly. In an urgent case, indeed, it may be given without regard to the stage of the paroxysm, and thus it would fulfil the indications of sedative, supersedent, and antiperiodic successively, as in bilious remittent fever. If we regard it as exercising a special action on the ganglionic nervous centres, it would be strongly indicated in paroxysms marked by pulmonary oppression, harassing and urgent dyspnœa. It should be given freely and without delay, with the view of equalizing the circulation, and its effect should be sustained beyond the next period of recurrence. But where there is no reason to suspect such a complication, it is the opinion of the writer that the quinine treatment in pneumonia is inappropriate, beyond its use as a tonic in convalescence. We have at command other sedative agents, to counteract the results of the local inflammation, equally potent and less disturbing to the stomach and brain, and therefore preferable.

The above remarks are equally applicable to puerperal fever, like pneumonia symptomatic of a local inflammation, and like it, liable to complication with malarial poisoning, within the sphere of its influence.

(*h*) Trousseau and Pidoux attribute to quinine a special sedative action on the nervous supply of the respiratory and circulatory systems, and a favorable influence on asthma and convulsive coughs. Cardiac neuroses, with excess of action, they consider especially adapted to its use; while it is contraindicated in sedative doses in grave organic lesions, and with those subject to intermission of pulse and fainting fits, in which cases digitalis is more appropriate.

(*i*) As a sedative in the *neuroses*, quinine doubtless has some

[1] New Orleans Med. and Surg. Journ., May, 1853.

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power to counteract pain and spasm; but there are other agents not less potent and far more prompt in action. Its application to this class of disorders purely, has been discussed already under the previous heads of *antiperiodic* and *supersedent*, and requires no further notice here. Malarial complications would, of course, call for this remedy with an urgency proportioned to their gravity, and to such complications the writer would limit its use, other than as a tonic.

E.—AS A PROPHYLACTIC.

Dr. Bryson, R. N.,[1] states that it has long been a standing order on the African station, when men are sent ashore on laborious duty, to issue quinine or cinchona in a spirit ration, as a preventive of the coast fever. It is usually given in wine, gr. iv to f℥j, and its usefulness is confirmed by numerous medical officers on that station. The British Army was provided with a similar preparation during the late war in the Crimea, and in China in 1859.

In 1861 the *U. S. Sanitary Commission*[2] issued a circular to medical officers, drawn up by Dr. W. H. Van Buren, recommending quinine as a prophylactic against malarial diseases. David Hoadley, Prest. Panama R. R. Co., stated to the Chairman of the Sanitary Commission, that it had been thus used among their employees on the Isthmus and on board their vessels visiting its ports, with great satisfaction. It was given dissolved in wine.

Dr. De Saussure, of Charleston, has a high opinion of its efficacy as a preventive of the *country fever*, which prevails on the rice plantations along the coast and rivers of S. C. A satisfactory trial was made during the construction of the Charleston and Savannah R. R., by a contractor on himself and 150 negroes from healthy portions of N. C.[2]

Dr. J. King Merritt, Surgeon to a mining and exploring company on the Isthmus in 1850, speaks in high terms of quinine as a prophylactic from his own experience. The following are his conclusions on this subject:—

"1. That no serious harm to the system ensues from the long-continued and judicious use of quinine. 2. That quinine given as a *prophylactic will certainly prevent the development of miasmatic*

[1] British Navy Med. Rep., No. xiv.
[2] Am. Med. Times, Oct. 19, 1861.

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disease, and neutralize malaria already in the system. 3. That the amount of quinine required to maintain a status of health under malarious influences is much less, when used as a prophylactic, than as a curative after development of miasmatic disease. 4. That the amount of quinine required as a prophylactic is more uniform, than as a remedy after attack of malarial disease. 5. That quinine will not always restore to health a person after repeated attacks of malarious disease, but will frequently fail to prevent malarial cachexia, especially if not removed from the miasmatic influences. 6. That cold, clear infusion of coffee is the preferable diluent for the morning dose, and whiskey for the evening dose of quinine as a prophylactic. 7. That quinine dissolved in spirit. nitri dulcis produces very happy effects, when administered during paroxysms of malarial fever."[1]

His practice was to give a 5-grain dose morning and evening, and he observed that the quantity could gradually be reduced.

Asst. Surgeon J. J. Woodward, U. S. A., states that quinine was extensively used as a prophylactic in the U. S. armies, during the fall of 1861 and the spring and summer of 1862. It was dissolved in whiskey gr. ij–iv to f℥ij, and f℥j was issued twice daily. The first impression of most surgeons was decidedly in favor of the practice, but it ultimately fell into disuse. The objections found to its use were, that it diminished the appetite, led to intemperance, and was disagreeable to take. Besides, it was found that the system gradually acquired a tolerance of the remedy and an insusceptibility to its remedial effects.[2]

In the summer of 1863 quinine was issued in a spirit ration to the crews of the fleet in Mobile Bay, by order of the C. S. Naval Commandant. The result of the trial was not satisfactory, and it was soon discontinued.

Prof. Wood regards quinine as the most efficacious preventive of miasmatic diseases. He advises enough to prevent an ordinary paroxysm to be given once or twice a week, in divided doses. Prof. Stillé, on the contrary, denies it any protective power whatever. Waring would rely on two or three grains daily.

In 1864 the writer had occasion to test the value of quinine as a preventive of intermittent fever in his own person, and became convinced that the most effectual plan was not to make a daily

[1] Am. Med. Times, Nov. 9, 1861.
[2] Outlines of Camp Diseases, 1863.

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use of it, but to resort to it in decided doses on the first warning. It is only necessary to exercise constant vigilance, for a paroxysm is generally preceded by unmistakable signs of malaise for a day or two previously, and the attack can be warded off by a few timely doses of quinine.

That insusceptibility to its remedial effects is the usual consequence of its uninterrupted use, has already been alluded to. There is also another objection, which, with many, would be irreconcilable to this plan—the growing disgust at taking it in any form, together with its increasing disturbance of the stomach and brain; the nausea, anorexia, ringing in the ears, and headache sometimes become intolerable. The weight of evidence is such that we must grant it some virtue as a preventive, and this idea is quite compatible with the views already adduced on its physiological effects and mode of therapeutic action; but its influence is probably limited in duration. When exposure to the miasm is for a period not exceeding a few days, or perhaps weeks, it is likely that the daily use of a moderate quantity might afford adequate protection.

By some practitioners, a prophylactic power is claimed for quinine over puerperal fever, when pushed and kept at the point of moderate cinchonism; but this is denied by others. On the affirmative are ranged, MM. Lecomte, D'Eu, Leudet, Piedagnel, Beau; on the negative, MM. Danyau and Delpech at the Maternité, and Depaul at l'Hôpital Cochin.[1] M. Cazeaux, also found no advantage in its use.[2] Prof. Retzius, of Stockholm, has claimed success for it as a preventive, given before confinement, ℈j during 24 hours.

A few experiments of this kind cannot be said to establish the point, where the chances of infection without the preventive are so far from being certain. The evidence does not satisfy the writer's doubts, and for the present he must estimate its value as a prophylactic in this disease, at about the same as that of belladonna in scarlet fever.

Precisely the same reasoning would apply to its alleged virtue as a preventive of cholera, by Gräfe and others.[3] As good a case might be made out in favor of most remedies of the pharmacopœia, for this special purpose; while the globules of the homœopaths, the nostrums of the patent-medicine men, and the specifics of the old women, would come in for their share of credit.

[1] Trousseau and Pidoux, op. cit. [2] Am. Journ. Med. Sci., Jan. 1857.
[3] Dunglison, op. cit.

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F.—VARIOUS USES.

(*a*) As quinine passes unchanged through the kidneys, Prof. Wood suggests that its local stimulation might be useful in chronic inflammation and ulceration of the pelvis of the kidney, of the ureters, and of the bladder; and in incontinence and retention dependent on want of tonicity of the bladder or sphincter. On certain individuals, it produces a decided diuretic effect, whenever taken in any considerable quantity, without irritation or other inconvenience than a frequent desire to urinate. Dr. Serres, of Dax, France, reports eleven cases of the successful use of quinine, in 8 or 10 grain doses every half hour, for dysuria and retention. Relief was obtained after the second or third dose, without any unpleasant symptoms, and probably by allaying spasm.[1]

(*b*) "Dr. Cochran has shown, by a large number of experiments, that cinchona and the salts of quinine exercise a *specific influence upon the activity of the uterus.* Exhibited some time before the period of the menses, it hastens their approach and renders them more abundant. When they have been arrested by cold or any other cause, it brings on their return. . . . . Cochran accounts for this direct action from the fact that the sulphate of quinine, in large doses, defibrinates the blood and renders it less coagulable."[2]

Dr. John Lewis, of Knightstown, Ind., uses ten grain doses successfully in *tedious labor*, preceded by a hot foot-bath and dry cups to the sacrum.[3] It might be doubtful whether his success was owing more to the drug than the external treatment.

This remedy has been accused of *inducing abortion* in pregnant women who have taken it freely in intermittent fever. No instance has occurred under the writer's observation, and he would more willingly attribute such a catastrophe to the disease than the remedy.

(*c*) *Nyctalopia* and *hemeralopia*, on the authority of Mr. Howard, of Montreal, are most amenable to quinine, in doses as large as can well be borne.[4] These derangements are frequently associated with miasmatic fevers, and may then be due to the same cause. When there is reason to suspect this, quinine would, of course, be indicated; but, under other circumstances, little benefit could be

[1] Am. Journ. Med Sci., April, 1858.
[2] Bouchardat, Ann. de Thér., 1860.
[3] Am. Med. Times, Feb. 16, 1861.
[4] Waring, op. cit.

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expected from it beyond its tonic effect, should that be required by the state of the general health.

(*d*) In *cholera* it was recommended, in 1849, by Drs. Bell and Bird.[1] Expectations in its use were based upon its presumed action on the sympathetic nervous system and its chemical relationship to morphia, strychnia, etc. It was tried at Hôpital Cochin, Paris, but was not approved.[2] On the other hand, a Dr. F. W. Sargent reported thirteen recoveries in seventeen cases of collapse under his treatment,[3] a result quite incredible. During the visitation of 1866, it had a fair trial in New Orleans, both in hospital and private practice, but was soon abandoned as useless.

(*e*) It has been proposed as an *anthelmintic*.[4] Any direct benefit of this kind must be attributed to its bitterness, but indirectly it might be useful as a tonic.

(*f*) In *enlargement of the spleen* this remedy is claimed to possess more value than any other, the appropriate quantity being ten to fifteen grains daily, in divided portions. It is said that a solution thrown into the spleen of a healthy dog produces speedy contraction,[4] and Piorry avers that it reduces the size of the healthy spleen, but Gourand and Valleix, after experimenting, deny this.[5] M. Mazel, of Nimes, suggests the application of quinine to a blistered surface over the enlarged spleen.[6] Many other substances would serve as well for irritants, while the quinine would be more effectually absorbed by some other route.

It may well be doubted if it exercises any direct control over this organ more than the other abdominal viscera, which we know are all subject to congestion during the cold stage of malarial disorders, when the blood forsakes the surface for the internal organs. Frequent engorgements of this sort, when no worse effects ensue, will produce an hypertrophy; but if the disturbance is quelled in season, the natural powers restore the *statu quo*. Now quinine, as an antiperiodic, is a peacemaker, and subsequently, as a tonic, is a defender of the circulation. This view may explain its alleged operation in the disorder under consideration, and define its just limits.[7]

[1] Waring, op. cit.
[2] Bouchardat, Ann. de Thér., 1850.
[3] Dunglison, op. cit.
[4] Waring, op. cit.
[5] Am. Journ. Med. Sci., Oct. 1847.
[6] New Orleans Med. and Surg. Journ., Nov. 1867, from Journ. de Méd. et Ch. Pract., April, 1867.
[7] See page 592.

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(*g*) Sir Thomas Watson uses quinine successfully in *erythema nodosum*, after an active aperient.[1]

Waring recommends it in *urticaria*.[2]

Prof. Z. Pitcher, University of Michigan, in a clinical lecture extols this remedy in *chronic eczema*. In the same paragraph he speaks of its benefits in *erysipelatous orchitis, consolidation of the lungs* in typhoid fever, *paraplegia, ophthalmia* with neuralgia of the ophthalmic branch of the fifth pair, and *engorgement* of the *spleen*.[3]

MODE OF ADMINISTRATION.

There is perhaps no other remedy of which it is so important accurately to determine the doses, time of administration, and mode of exhibition, since these must vary with the character of the malady and the condition and idiosyncrasies of the patient.

Trousseau and Pidoux, and Briquet, regard a solution aided by sulphuric acid as the readiest and most efficacious form for obtaining its effects. The bitter taste, which is a great objection with many, may be counteracted by giving it in powder with a fourth or fifth part of tannin, mixed in syrup; or by dissolving in strong coffee. Briquet believes its efficacy to be impaired by the formation of the tannate of quinine in both these modes, but it has been found that this salt has about equal power with the sulphate. Chocolate also is found to disguise its bitterness very efficiently. The dose may be dissolved in a cup of chocolate, or a piece of the prepared article may be dissolved in the mouth immediately after taking the dose. A preparation, called sweet quinine, has lately been introduced to the public, in which it is said that the molecules are enveloped in glycyrrhizin. It is reputed to be of three-fourths the strength of the crystallized salt, but it is evident that the ethics of commerce would not long secure any uniformity of the active constituent.

For a rapid and powerful effect, a clear solution in acidulated water is preferable, if tolerated by the stomach. The pilular form is found, however, the most convenient for general use, except with young children. Made in the ordinary way the pills become very hard and insoluble in the course of time, and may even pass

[1] Practice of Physic. [2] Pract. Therap.

[3] For his views on its mode of action, see pages 591–2.

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through the body undissolved; but the addition of one-fourth part of tartaric acid to the pill mass preserves their solubility.

It occasionally happens that the stomach is quite intolerant of the remedy, and we must then resort to its administration by enema. In this case the addition of some liquid preparation of opium makes its retention more certain, and no doubt adds to its efficacy. Trousseau and Pidoux direct that the quantity should be reduced in this mode of exhibition, as its absorption is more rapid and complete than by the stomach. Ronzier-Joly thinks the dose should be about the same.[1] These views are at variance with the opinions of most medical men, that remedies in general are much less efficacious by the rectum than by the stomach.

The hypodermic method, which has lately come into use, is by far the most rapid means for obtaining its effect, and the dose may thus be reduced three or fourfold. When circumstances render either or both these considerations imperative, this mode may be resorted to. The salt may be dissolved in a quantity of water not exceeding 20 or 30 minims by the aid of sulphuric acid, and this should be neutralized by the addition of an alkali as long as the solution remains clear. Owing to the irritating properties of a solution aided by sulphuric acid, M. Claude Bernard has proposed the following formula:—

"℞.—Quiniæ disulphat. gr. xv;
Acid. tartaric. gr. viij;
Aquæ destillat. ʒijss.—M."[2]

Unless some such precaution be taken a troublesome ulcer or diffused cellular inflammation may be the result of the introduction of irritating fluids beneath the skin, and examples are not wanting to serve as a warning.

On a blistered surface it may be applied in solution or rubbed up with lard, and in the latter form some effect may be obtained in infants through the sound skin. M. Flandmi, of Grenoble, observes that quinine is soluble in about two parts of warm and fifteen parts of cold oil. M. Breton prepares in his laboratory a kind of soap, formed of two parts of stearine to one of quinine.[3] These preparations are suitable for infants, and may be rubbed in the axilla, the groin, and the flexures of the joints.

[1] De l'Administration du Sulf. de Quin., 1856.
[2] Ann. de Thér., 1865.
[3] New Orleans Med. and Surg. Journ., Nov. 1867.

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It has even been proposed by Rosenstein to give it to the nurse, and look for its effect upon the infant in the milk;[1] but cases must be rare when this plan would become necessary.

For its general tonic effect, quinine may be given in the form most agreeable to the patient, in doses varying from one to three grains three times daily. When iron is indicated by a state of anæmia, the two may be combined, and the double citrate of iron and quinine is an elegible preparation.

As an antiperiodic in intermittent fever, a variety of opinions have been entertained as to the regulation of the quantity and time of administration. Since the same reasoning applies mainly to cinchona and its alkaloids, a review is presented of the different plans recommended by writers on this subject.[2]

The Roman method, the first one known in Europe, communicated by the Jesuits of Lima to those at Rome, was generally adopted in Italy, and was the one practised by Torti. He gave ʒij of powdered bark in one dose immediately before or after the access, with special reference in both cases to the subsequent one; then two days in succession ʒj in one dose at the same hour. After an interval of eight days ʒss was given eight days in succession.

The method of Sydenham, or the English method, was to give ʒvi–viij of bark in doses of ℈ij every four hours, beginning at the end of a paroxysm. This process was repeated in eight days, and twice more at the same interval.

Bretonneau's plan was to give ʒij of bark, or gr. xv of quinine in one dose, or two closely approximated, as long as possible from the expected access during the apyrexia. After five days' interval this was repeated; again in eight days, and then every eight days for a month.

Briquet's opinion is, that quinine should be given during the apyrexia, the last dose twelve to fifteen hours before the expected access; and that it is more efficacious in divided portions than in a single dose.

The method recommended by Trousseau and Pidoux is to give immediately after the paroxysm ʒij of bark, or gr. xv of quinine in one dose; in twenty-four hours the same is repeated, and again at successive intervals of two, three, and four days; then every eight days for a month.

Prof. Wood directs the remedy to be given in small doses every

[1] Trousseau and Pidoux, op. cit. [2] Trousseau and Pidoux, op. cit.

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hour or two from the subsidence of the paroxysm till within an hour or two of the period of recurrence. Thus he thinks there is less danger of gastric and cerebral disturbance; that the absorption is more complete; that a less quantity is required; and that the system is under the full influence at the time of access. In purely irritative intermittents, he directs gr. vj–xij to be used altogether; in ordinary miasmatic intermittents, gr. xij–xxiv; while in the pernicious form gr. xxiv–℥j are required. He does not, like the before-mentioned writers, recommend the treatment to be continued, to prevent relapse, but to ascertain by observation the period of return, and prevent it by giving the quantity necessary to interrupt a paroxysm during the two days previous; and so on for a month or two. This period, for some unknown cause, is generally a multiple of seven.

In common with Dupasquier and Elliotson, Prof. Dunglison advises the remedy to be given in a single dose shortly before the expected access, and believes this plan to be economical.[1]

Prof. Stillé thinks it economical and more certain to give the whole quantity in a single dose.

Drs. Pfeuffer and Meyer give a single dose five or ten hours before the access.[2]

Prof. Niemeyer, University Tubingen, prefers the same method, unless there is danger of its rejection by the stomach. He continues it for a few days in diminished doses, and having waited to discover its period of return, whether seven, fourteen, or twenty-one days, then uses it as a preventive.

Dr. Murchison regards a single dose in the sweating stage, as the most effectual plan of preventing the succeeding paroxysm.[3]

Dr. A. F. Corbyn, who has had large experience in the fevers of India, recommends that quinine be given in a single large dose. Dr. Mackinnon gives it at or near the close of the sweating stage in intermittent fever, as the most efficacious and economical plan, ℈j–℥ss in connection with a purgative. He remarks:—

"I have not found it to produce vertigo, tinnitus, or other cerebral disturbance in a greater degree than small doses frequently repeated do."

Dr. Mactier used it in the same way, with the greatest satisfaction.[4]

[1] Dunglison, op. cit. [2] Elements of Int. Path.
[3] Edinburgh Med. and Surg. Journ., Jan. and April, 1855.
[4] Am. Journ. Med. Sci., Oct. 1854.

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The dose, of course, must be appropriately diminished, to adapt the remedy to the use of children. With due attention to this point, they tolerate it as well as adults, and the writer is inclined to believe, with less inconvenience. According to Briquet, females require about one-fifth less than males. He believes that its action is promoted by depletion and by combination with opium, which increases the sedation of large doses, and diminishes cerebral excitement; and that its action is counteracted by alcohol and coffee.

Ronzier-Joly observes that feeble individuals, and those of delicate constitution, require less than the vigorous and previously healthy; also that the bilious temperament requires larger doses than the lymphatic and sanguine, while the nervous is more liable to injury from large doses. He prefers to give the whole quantity in one dose, as being less troublesome to those who object to its taste.

Such is the diversity of opinions respecting the mode of administering this remedy for its antiperiodic effect, that one may be allowed to act independently, and differ from them all. So various are the modifying circumstances, that it seems useless to lay down definite rules for the governance even of ordinary cases. Each case should be treated on its own merits, and diligent observation, with some experience in the use of the remedy, is requisite to qualify a practitioner for its proper management. The writer is fully convinced that nothing but actual practice will perfect one in the use of this remedy; but it would hardly be proper to omit here the views which he has adopted after no small experience, and which may be useful to the tyro.

As the antiperiodic power of quinine is exerted by the impression made upon the nervous system, by which it is pre-occupied and rendered insensible to the return of the disturbing cause, it is important that this impression should be at its height at the period of invasion. When this period is determined, and its recurrence known to be due at a certain hour, it is practicable to regulate the doses accurately. In general practice, however, it will be found useless to attempt close calculations, both from irregularities in the disease itself, and from want of intelligence and accuracy on the part of patients to make correct observations. A precession in the return of paroxysms is quite frequent, and occasionally a retardation may be observed. Again, it is impossible to determine, on the first appearance of an intermittent, whether it will be quotidian or tertian in its type, while it is desirable not to subject the

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patient to the danger of another paroxysm in order to discover the fact. The chief object of the practitioner should be to prevent the next paroxysm, and the surest plan, therefore, is to treat an unknown type of intermittent as though it were both quotidian and tertian. Ascertain as nearly as practicable the hour of access, and be sure to forestall it by an efficient impression of the antiperiodic on both days. For producing this impression, the writer regards six or eight hours as, in general, amply sufficient, and believes that the attempt should be made with only one-half the time. Could we be certain of the hour of access, and the condition of the patient's stomach warranted its retention, it would probably be better to administer the whole quantity in solution at one dose, about three hours in advance. Pills, in proportion to their hardness and insolubility, require a longer time for absorption.

So much uncertainty, however, attends a large proportion of cases that it is safer practice to distribute the remedy in three or four portions over six or eight hours, ending two or three hours before the presumed access. When this is due before 9 A. M., it is well to give about half in pilular form as late as convenient the night before, and resume administration in solution on first waking in the morning, or at daylight. At the same time it is advisable to keep the patient quiet in bed, for thus the medicine is better absorbed and is less liable to disturb the stomach and brain.

The writer's own observation and the testimony of his *confrères* have convinced him that great inconvenience may result from the too late administration of quinine as an antiperiodic. When its impression on the nervous system follows the access, instead of anticipating it, the remedy seems rather to increase than diminish the severity of the paroxysm. In such cases the quantity exhibited is too small to act as a supersedent or sedative, and the effect may be compared to that of insufficient doses of opium in delirium tremens. Hence the importance of exercising sound discretion in regulating the time of administering this remedy; for when no more than an hour or two in advance of the access can be counted on, it is preferable to let the paroxysm take its natural course, than run the risk of aggravating the nausea and headache and inducing delirium and prolongation of the febrile stage.

These directions are applicable to ordinary intermittents, where no solicitude is felt about the result; but in those of a severely congestive and pernicious character, promptness in action is of the highest importance. The impression of quinine should be secured

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at the earliest possible moment after the subsidence of the fever, and in urgent cases it should be given freely during the stage of febrile reaction. This influence secured, it must then be continued by repeated doses for forty-eight hours, after which time the patient may be considered safe.

From what has already been said under another head, it may be inferred that the writer would not advise the continuance of the remedy with a view of preventing future attacks; but to meet each on its approach, and having ascertained the period of revolution, so to speak, then to anticipate and prevent it.

Hitherto no directions have been given as to the quantity to be administered, from a desire to treat each point distinctly by itself. Age, sex, and temperament have already been alluded to, and should be taken duly into consideration. Other important considerations are the region of country, which greatly influences the severity of malarial diseases; the season of the year, for the gravity of these maladies increases as summer advances to autumn; the degree and manner of exposure, for miasmatic influences are stronger at night, and more injurious to those sleeping than those awake; the state of previous health, for disease and debility render one less able to encounter miasms. Though the doses mentioned by Prof. Wood are probably suitable for the region of country in which he has met miasmatic diseases, the writer is satisfied that they are inadequate for treating them in the more southern and western portions of the country; while still smaller ones may suffice in the more northern and eastern portions. Within the sphere of the writer's experience—Alabama, Mississippi, and Louisiana—it would not be advisable to rely on less than ℈j for an adult male, to arrest an ordinary intermittent, and due allowance must be made for increased severity.

The heroic practice sometimes resorted to in malignant intermittents might strike with astonishment one unaccustomed to those maladies and this remedy. M. Maillot, who served with the French forces in Algeria, and wrote on intermittent fever in 1836, relates some remarkable instances, of which the following will serve as an example: A soldier was attacked in Jan. 1835, with a pernicious quotidian, to whom he gave ℈iv of quinine by the mouth and ℥j by enema in a few hours, accompanied with free venesection. The following day ℈ij were given at one dose, and the next day gr. xxiv. Rapid convalescence followed. Dr. B. Rush Mitchell, of

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Madison, Indiana, gave ℥ss within four hours, in a case of pernicious intermittent, with no other result than recovery.[1]

With regard to previous preparation, modifying circumstances play an important part. When the attack is a dangerous one and the recurrence of the paroxysm imminent, there is no time for preliminary measures; though, when clearly indicated, the appropriate purgative may be administered along with the quinine. The rule should be to let the antiperiodic take precedence of all other remedies, which, according to their indication, may be given so as least to interfere with its action. No general treatment is needed by way of preparation for this remedy, but collateral indications should be attended to with due reference to their relative importance.

From considerations of economy or scarcity it is sometimes important to employ adjuvants, and favorable mention has already been made of opium. Some good may be expected from the nervous and diffusible stimulants and aromatics. Piperin, the active principle of black pepper, is believed to possess some antiperiodic property, and all the peppers may be found useful in combination with quinine. Of these the oleoresina piperis, and capsicum would be most convenient, and might be reinforced by opium. The following formula has been recommended by Dr. O. C. Gibbs, of Chatauque Co., N. Y.:—

℞.—Quiniæ sulphatis,
Acidi tartarici, ää ℈ij;
Tincturæ opii, ℥ij–iij;
Tinct. capsici, tinct. camphor., ää ℥ij;
Syrup. ℥x.—M.

S.—℥ss two or three hours before access; repeat ℥ij every morning two or three times; then ℥j till finished, if quotidian; and every second morning, if tertian.[2]

In intermittent neuralgia, after waiting for an intermission, quinine is to be exhibited upon the same general principles which govern its use in the miasmatic fevers. It is necessary to push it to decided cinchonism, and it should be repeated with reference to a second or third paroxysm. In these painful complaints, opium will be found a useful addition.

In regular remittent diseases quinine is scarcely, less efficient than in the intermittent. The proper time for administering it in miasmatic or bilious remittent fever, is on the first appearance of

[1] New Orleans Med. and Surg. Journ., July, 1846.
[2] N. A. Med.-Chir. Rev., Jan. 1857.

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remission, and the influence of the remedy should be constantly maintained beyond the second paroxysmal period. The pernicious form admits of no delay, and the quantity must be doubled or tripled.

E. Hare, Esq., Deputy Inspector-General of Hospitals in Bengal, experimented with quinine as an antidote of miasmatic fevers, giving it irrespective of all variations of symptoms, except that the doses in amount and frequency were in direct proportion to the violence of the case. He administered it in thick mucilage in doses of ʒj–iss, generally three times daily, but in urgent cases every three or four hours till cinchonism ensued. They were then reduced and continued two or three days. He remarks:—

"Quinine may also be given in the largest doses, whether there are head symptoms, delirium, coma, or pain in the liver. Whether it be in the hot stage or the cold, quinine is not only safe for all forms of malarial fever, but its certain cure. Vomiting and full cinchonism were my only checks for continuing it in full doses."

Under previous treatment in the military hospitals of Bengal, the mortality of fever cases was 1 in 30; under this, he found it 1 in 211¼. In vomiting he found combination with calomel of great advantage, and believes that they mutually promote each other's action.[1]

This kind of practice is doubtless more successful in the pestilential climate of India and the African coast than a timid and sparing use of quinine, but where the miasm is comparatively mild, it would not only be unnecessary, but inappropriate. Even in those climates it is better to estimate the severity of each case and treat it accordingly, than to manage all cases alike.

As to preparatory treatment, there is even less time to operate in this way with remittent fevers than with the intermittent. Quinine must take precedence of other remedies, which may be used, with this limitation, according to their indication.

In remittent neuralgia it should be given in decided doses, on the first appearance of remission, till the supervention of cinchonism, and this effect should be maintained from twenty-four to forty-eight hours.

The quantity of quinine necessary for its sedative and supersedent effects may be said to vary from ʒss to ʒij within a few hours. The

[1] Braithwaite, July, 1865.

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operation of the remedy should be closely watched, and if it is thought necessary to maintain its effect, it may be gained by the use of reduced doses—say gr. v–x every three hours.

The credit of introducing the use of quinine in large doses has been claimed by various practitioners. Dr. Bennet Dowler, of New Orleans, has been at some pains to investigate this point,[1] and states that six or eight grain doses were first administered in this country by the late Dr. Sam. A. Cartwright, then of Natchez, in 1826. In France, Laennec is stated to have used six grain doses in pernicious paroxysmal pneumonia about 1820. Originality of large doses has also been attributed to Drs. James Metcalfe and Perrine, of Miss., and Dr. Thos. Fearn, of Ala.; but it is probable that the two former were indebted to Dr. Cartwright for the suggestion, who asserted his precedence over all other claimants. In 1828 it was given in ʒij doses [probably in divided portions], in the province of Berbice, British Guiana, in remittent fever.[2]

PREPARATIONS OF QUININE.

The advantage of the salts of quinine over the simple alkaloid is their superior solubility and facility of absorption. Of these the *sulphate* is the one almost universally employed, and the one preferable for general use.

Trousseau and Pidoux regard the *chlorohydrate, nitrate, carbonate, citrate,* and *acetate,* as less powerful.

The *phosphate* and *ferrocyanate* have been praised by some, but French experience has not found them to possess any advantage.

The *lactate* is very soluble and less bitter than the sulphate, and would be preferable for a delicate stomach; but its expense would be an objection.

The *valerianate* is sufficiently soluble and cheap, and is supposed to possess some antispasmodic property; but this advantage is counterbalanced by its chemical instability and uncertainty.

The *hypophosphite* is suggested by Prof J. Lawrence Smith as a remedy applicable to the hectic of phthisis; also as a tonic in phthisis and the cachexia in which quinine is used. It is crystal-

[1] New Orleans Med. and Surg. Journ., Jan. 1860.
[2] Note by Dr. Davy, in Blair on Yellow Fever, 1847.

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line, and water at 60° F. dissolves gr. viij–℥j.[1] Dr. Archie B. Cook, of Louisville, testifies to its efficacy as an antiperiodic.[2]

The *iodide* of quinine is thought to possess alterative along with its other properties, and the iodide of iron and quinine is said to be successful in warding off rebellious intermittents. An unguent of the iodohydrate of quinine has been recommended for enlarged spleen.

The *bromide* has been employed by Dr. Saleno, of Venice, in epilepsy, mania with excitement, delirium, total disorder of the intellect and diminished sensibility, and intermittent mania. In epilepsy no positive good effects were observed; in eighteen cases of acute mania all but two were benefited, and seven recovered; of fourteen cases of intermittent mania, all but two recovered under twelve grain doses every eighth day.[3] Successful results of its use in various forms of neuralgia are lately reported. It is quite reasonable that the bromine might modify it usefully for these complaints.

The *chlorate* of quinine has been introduced by Dr. Lyons, of Dublin, and found beneficial in grave forms of typhus, typhoid, scarlatina, smallpox, low phlegmonous inflammations, etc. While diminishing the frequency it increases the force of the pulse. Its specific application is that of a tonic, in doses of gr. iij–v, in solution by aid of perchloric acid.[4]

The *tannate* is said to be equally efficient with the sulphate, while it is cheaper, less offensive to the taste and stomach, and less liable to produce nervous derangements. Being, however, uncrystallizable, it is liable to adulteration.

The *arseniate* is supposed to combine the antiperiodic properties of both constituents, but its utility is doubted by Garrod. The dose is small, not more than gr. ¾–1½ in twenty-four hours.

The *di-arsenite* is very soluble and less bitter than the sulphate, and has been recommended in ague, neuralgia, and chronic cutaneous diseases. Briquet prescribes it with much satisfaction in cases of intermittent fever, acute and chronic rheumatism, before treated with the sulphate. The pulse has been observed to fall twenty beats to the minute when gr. $\frac{1}{10}$ daily was used. Briquet commences with gr. $\frac{1}{25}$, and cautiously increases the dose to gr. ½. It was first proposed by the Italian school.[5]

[1] Cincinnati Lan. and Obs., July, 1859.
[2] Id., Nov. 1859.
[3] Ranking's Abstract, vol. xlvi.
[4] Braithwaite, July, 1867.
[5] Med. Times, June 3, 1848.

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The *camphorate* is recommended by Vicenzo Frozini Marletta da Misterbianco. He uses it in combination with the antimoniate of quinine, about gr. ss of each every half hour, to which he attributes a special efficacy in grave fevers and the neuroses.[1]

The inhalation of *quinic ether* has been praised in Italy for the treatment of intermittent fever. Two *grammes*, or a little more, are used at the beginning of a paroxysm, as we administer chloroform; and it is rarely necessary to repeat the inhalation a third time. The method of preparing this ether is given in the work denoted.[2]

Quinium, which is a solid extract of cinchona, containing all its alkaloids, the coloring matter and some resinous or fatty extracts, is highly recommended by M. Regnault, who gives one to three *grammes* daily in intermittents.[3] It is slower in action, but not less sure than quinine, and does not produce the ringing in the ears, deafness, and gastric disturbance, so objectionable in the latter. For the wine of quinium he claims a powerful tonic purgative property, which fits it for the treatment of the œdema following malarial fevers. He claims also that relapse is less to be feared with this remedy than with quinine.

Quinoidine, or amorphous quinine, is equally efficient, when pure, with its crystallized homologue, and its price commends it on grounds of economy. But the liability to adulteration must prove a serious drawback to the introduction of this, as well as the previous preparation, into general use.

ABUSES AND DANGERS IN THE USE OF QUININE.

The enormous doses in which this remedy has often been used proves that it cannot strictly be ranked among the poisons, and yet it must be admitted that it is capable of doing serious mischief. It would be hard to define the limits of safety, for they must vary with individuals, and the morbid conditions in which they may be thrown. Where a clear indication exists for the employment of this remedy, there is little danger in its use within medicinal limits. Should severe cinchonism supervene, this will probably pass off in a few hours, on its discontinuance. It is to be presumed that few would be inclined to follow the example related by Prof. Dickson,[4]

[1] Bouchardat, Ann. de Thér., 1866.
[2] Id., 1860.
[3] Id., 1861.
[4] Dunglison, op. cit.

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of a practitioner in Alabama, who gave ʒss doses for seventeen successive hours; or of the Western doctor, who made his patient swallow ℥j in a single night, though the result might not have been fatal.

Cases of death following the ingestion of large quantities have occurred in the treatment of disease, which might reasonably be attributed to the effects of the drug. A subject of acute rheumatism under charge of M. Recamier took forty-eight grains on each of two successive days. Death rapidly ensued, with grave cerebral symptoms and post-mortem signs of meningitis.[1] Two similar cases occurred in the practice of Briquet. In these instances, death may have been due to a strong predisposition to cerebral disorder, or its actual pre-existence. It is certainly a dangerous remedy when congestion exists at the base of the brain, or a morbid tendency that way.

The experiments of Melier and Magendie, on animals, showed that excessive doses produced congestion of the lungs and deficient coagulability of the blood. The more palpable toxic effects are deafness, blindness, stupor, and prostration. In such cases, diffusible stimulants are obviously called for, and the stimulating effects of a strong decoction of coffee, or its alkaloid, caffein, might be beneficial.

The degree of tolerance possessed by individuals in previous health is illustrated by two cases quoted by Prof. Wood,[2] in one of which recovery followed the accidental ingestion of ʒiij; the other, being partially insane, took ℥vij in nine or ten days, and died.

The deafness resulting from too free use of quinine sometimes persists for days, and even weeks, and in rare cases has been permanent.

Briquet charges this medicine with producing hydræmia. This might be counteracted by combination with iron.

It is stated, on the authority of M. Chevalier, that workmen employed in the manufacture of quinine are subject to a cutaneous affection, which sometimes compels them to suspend work for a fortnight, a month, or sometimes altogether. Zimmer, of Frankfort, speaks of a peculiar fever affecting workmen engaged in pounding bark, of such severity that they are unwilling to risk a second attack.[3] It is well known that the homœopaths have

[1] Bouchardat, Ann. de Thér., 1843.
[2] Ther. and Pharmacol.
[3] Buffalo Med. Journ., Nov. 1858.

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adopted cinchona, or its alkaloid, as a cure for ague, with the assertion that they produce symptoms resembling ague in a healthy person. It is not inconsistent with the views herein maintained upon its physiological effects and mode of therapeutic action, that its free and continued use might produce a nervous erethism, amounting in some cases to an actual poisoning. Some ill-effects of prolonged use of the medicine have already been mentioned,[1] and it is reasonable that a disregard of such warnings might lead to serious injury.

In cases of chronic engorgement of the spleen, not attributable to miasmatic influence, Ronzier-Joly thinks quinine injurious, rather adding to the mischief. He believes it capable also of exciting hepatic disorder, by extension of irritation from the stomach and duodenum.

Where malarial diseases prevail, there is a strong tendency among practitioners to extend the use of this remedy to a great variety of maladies in which it is not appropriate and may be injurious. Hence arose its application to some of the phlegmasiæ and the continued fevers. Its power to arrest periodic fevers naturally leads to the hope that it may prove a universal febrifuge; the hope begets expectation, which a fervid imagination sees verified by experiment. Thus convinced, Dr. Charles McCormick, U. S. A.,[2] writes that he uses quinine in fevers intermittent, remittent and continued; in acute and chronic rheumatism; neuralgia, tetanus, dysentery, diarrhœa, cholera morbus, cholera infantum, asthma, icterus, measles, and scarlet fever; that it is good in every stage of fever, and no injurious effects are observed when it is given in large doses, even during the highest febrile excitement; and that he uses it in any inflammatory disease whatever, in large doses—say ʒss. Views of a similar nature are to be observed here and there in the medical journals of the last twenty-five years, but they have not been advocated in systematic treatises, nor to any considerable extent been taught in the schools. But for the incontestable merits of quinine, such extravagance in its use would have been followed ere this by its disgrace, as is now the case to a great degree with venesection and the mercurials.

Briefly to review its uses and abuses, a synopsis of the writer's views is here presented:—

It is the most valuable of the known vegetable tonics; it is our

[1] See page 619. [2] New Orleans Med. and Surg. Journ., Nov. 1845.

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chief reliance in miasmatic fevers; it is very efficient in all periodical paroxysmal complaints; in these maladies its excessive use may be injurious, but it is safer than any other remedy of equal power. In the phlegmasiæ and continued fevers it possesses no curative properties, and its liability to produce cerebral and gastric disturbance renders it inappropriate and often dangerous, except sometimes as a tonic in convalescence.

That its scope of usefulness will be extended much beyond the limits herein designated, the writer is not disposed to expect; but assuredly its importance cannot well be overrated, when we consider the millions of our race who are indebted to it for the breath of life and health in an atmosphere teeming with disease and death, where science yet fails to find an equivalent.

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PRIZE ESSAY.

THE

PHYSIOLOGICAL EFFECTS

AND

THERAPEUTICAL USES

OF

ATROPIA AND ITS SALTS.

BY

ROBERTS BARTHOLOW, M.D.,

OF OHIO.

Repertio deinde jam remediis, homines de rationibus eorum disserere coepisse; nec post rationem, medicinam esse inventam; sed post inventam medicinam, rationem esse quaesitam.

CELSUS, Lib. I.

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La méthode expérimentale, considérée en elle-même, n'est rien autre chose qu'un *raisonnement* à l'aide duquel nous soumettons méthodique nos idées à l'expérience des *faits*.

BERNARD, *Introduction à l'Etude de la Médecine Expérimentale.*

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PRIZE ESSAY.

THE

PHYSIOLOGICAL EFFECTS AND THERAPEUTICAL USES OF ATROPIA AND ITS SALTS.

SCHEME.

In the following pages I have endeavored to ascertain whether our present notions are well-founded in regard to the physiological effects and therapeutical uses of Atropia, and have attempted to add something to the existing stock of knowledge on these subjects. Further, it seemed to me desirable to study the mutual reactions which obtain between atropia and those remedial agents which have properties apparently physiologically antagonistic. Accordingly, after an examination of the physiological effects of atropia, I have extended my researches to include the effects of atropia and physostigmia; of atropia and morphia; of atropia and strychnia; and of atropia and prussic acid. In executing such a design, it is, of course, unnecessary for the investigator to examine subjects no longer involved in doubt. Whenever I have come to points about which differences of opinion exist, or in respect to which it may be desirable to have some further information, I have undertaken the task of examining them anew. It may happen in this way that I pass over ground already explored. The points in which I agree with those who have preceded me, will, therefore, seem to have received additional support. When I have diverged from the settled beliefs, my opinions will appear to be well-founded or not, according to the strength and consistency of the facts adduced in support of them.

My plan includes, also, a study of atropia as a therapeutic agent The ultimate object of all inquiry into the action of remedies is to

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increase the means of cure. Moreover, the results of the experimental and clinical methods should be compared, in order to correct the errors of each. We may justly distrust observations based solely upon one of these methods of inquiry. Results obtained by experiments upon animals may be judged insufficient to interpret phenomena as observed in man; clinical observations may be considered unreliable because of the great and constant danger of confounding the *post hoc* with the *propter hoc*. When, however, the facts of both methods agree, we can hardly refuse to accept the conclusions to which they conduct us.

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PART I.

EXPERIMENTAL INQUIRY.

CHAPTER I.

PHYSIOLOGICAL EFFECTS OF ATROPIA.

It will save space to admit, that atropia is absorbed into the blood, and through this medium comes to affect remote parts. All authorities are agreed upon this point. It will be convenient to assume, also, what will hereafter be proved, that atropia has a selective action upon certain tissues, that it modifies in a peculiar way the vital endowments of these tissues, evoking phenomena which are characteristic. The symptoms which it produces belong to the nervous system. We may, therefore, assume further, that atropia has a special affinity, so to speak, for nervous tissue. It does not remain long in contact with this tissue, nor combine with it, but having modified its functional acts, passes quickly out of the organism. That, locally applied, it acts upon nervous tissue, we have the proof in the pallor and anæmia which result when a concentrated solution is brushed over a mucous surface; in the dilatation of the pupil, when a solution is dropped into the eye; in the arrest of pain in a part, when it is used over the affected nerves. Learning these facts, we are ready to believe that atropia introduced into the blood, by virtue of an elective affinity—to borrow a term from the chemists—applies itself to nervous tissue.

It is the purpose of this experimental inquiry to ascertain the truth of these assumptions, and to learn what is the real nature of those dynamical changes exerted by atropia on those tissues of the body especially affected by it. In order to accomplish this design it is necessary to commence with the

Effects of Atropia on the Nervous System.[1]—The frog is the most

[1] I have in this inquiry imitated the methods of investigation pursued by Bernard, in his study of the action of the opium alkaloids, and, also, in his *Leçons sur la Physiologie et la Pathologie du Système Nerveux.*

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suitable animal for experiments, in studying the actions of remedial agents on the nervous system. In this animal the different parts of the nervous system may be readily examined, and the influence of agents upon them leisurely determined, with almost mathematical accuracy.[1]

In order to a satisfactory determination of the action of atropia on the nervous system, we must first ascertain what influence it has upon the irritability of muscle.

Experiment.—Injected under the skin of the back of a frog a solution containing ½ grain of sulphate of atropia. The first effect observed, was a disorder of muscular movements. In jumping he rose to a considerable height, but fell upon his side. His hind extremities could not be controlled, but sprawled out. These defects of co-ordination were succeeded in a short time by paralysis. The hind extremities became limp, and although he manifested uneasiness when an irritant was applied, was unable to remove them from the source of irritation. The forearms were doubled up under the body, and he manifested a tendency to roll upon the side. An electrical current and mechanical irritants applied to the sciatic produced no contraction of the muscles (gastrocnemius). Direct irritation at first produced muscular contractions, but the muscular irritability was finally lost. The chest was then opened by dividing the sternum, and the heart's action studied. The pulsations of the heart were sixty-two. The apex had a more forward direction, and the ventricular contraction seemed more powerful than is usually observed under these conditions, without the administration of atropia.

In this experiment we perceive that frogs are susceptible to the action of atropia. Co-ordination of the muscles to execute a given movement is first disturbed then destroyed. Next we observe motor paralysis and then sensory paralysis, the muscular irritability being last to disappear. It is necessary, however, to ascertain with more particularity the relation of these phenomena to each other.

[1] Mais s'il fallait tenir compte des services rendus à la science, la grenouille mériterait la première place. Aucun animal n'a servi à faire de plus grandes et de plus nombreuses découvertes sur tous les points de la science, et encore aujourd'hui, sans la grenouille, la physiologie serait impossible. Si la grenouille est, comme on l'a dit, le Job de la physiologie, c'est-a-dire l'animal le plus maltraité par l'expérimentateur, elle est l'animal qui, sans contredit, s'est associé le plus directement a ses travaux et à sa gloire scientifique.—BERNARD, *Introduction à l'Etude de la Médecine Expérimentale*, p. 201. Paris, 1865. J. B. Baillière et Fils.

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Experiment.—To determine whether the irritability of muscle, or the excitability of nerves is destroyed, inject as before one-fourth of a grain of atropia. When a perfectly flaccid condition of the muscles of the inferior extremities has been produced, isolate the lumbar nerves and apply irritants to them. No contractions of the muscles follow. A galvanic current applied to the gastrocnemius itself, cannot induce its contraction. I find, however, on repeating this experiment, that at an earlier period before complete paralysis is produced, galvanic stimulation applied to the muscle will cause feeble contractions.

It is evident from these experiments that atropia destroys the excitability of nerves and the irritability of muscle, but the loss of muscular irritability takes place, only, after complete paralysis. Lemattre,[1] who has performed this experiment, states in his "conclusion" that the muscular irritability is not entirely destroyed; but, as I have above shown, the result will depend upon the time at which the galvanic irritation is applied to the muscle.

In experiment first, the motor excitability seemed to end before the sensory. Botkin[2] of St. Petersburg who has examined this point, asserts that such is really the result. On the other hand, Lemattre, in his "conclusion," states that the motor excitability survives the sensory. In order to determine this point, it is necessary before bringing the animal under the influence of atropia, to isolate a group of muscles from the blood supply, whilst maintaining the nervous connection. This may be done, by including in a ligature all of the thigh except the sciatic nerve. When the effects of atropia manifest themselves by paralysis of the limbs not embraced in the ligature, an irritant applied to one of the fore extremities will induce reflex contractions in the muscles of the ligatured limb. When this effect can no longer be produced—showing loss of the excitability of the sensory nerves—a galvanic current applied to the sciatic of the ligatured limb will induce contractions of the muscles of this limb—showing that the motor excitability survives the sensory. Such are the details of an experiment performed by Lemattre to solve this problem. Repeating this experiment I was conducted to precisely the same conclusion.

These observations are opposed to the statements of Prof. A. Von Bezold and Dr. Fried. Blœbaum,[3] who have investigated the

[1] Archives Générales de Médecine, Juillet, 1865, p. 49.

[2] Sydenham Society Year Book, 1862.

[3] Journal of Anatomy and Physiology, May, 1868. American Journal of the Medical Sciences, July, 1868.

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actions of the sulphate of atropia. These observers affirm that atropia does not affect the muscular irritability, but that it destroys the irritability of the peripheral terminations of the motor nerves. Their conclusions with regard to its action on the sensory nerves are the same as those of Lemattre, which I have confirmed by my own investigations.

Since atropia produces, as I have above shown, paralysis of motor and sensory nerves, it may be presumed to exert this action on the pneumogastric. As this nerve is now generally considered to be the inhibitor or regulator nerve of the heart and lungs, the action of atropia in increasing the action of these organs may be ascribed to the paralyzing action of this agent on the pneumogastric. This is the view taken by Dr. Meuriot,[1] who thinks that the increased action of the heart is due to paralysis of the terminal filaments of the pneumogastric. Lemattre, who has experimentally examined this question, finds that notwithstanding division of the pneumogastric, atropia still increases the action of the heart. It must therefore act as a stimulant to the nervous system of organic life. Meuriot admits that atropia may have an exciting action upon the sympathetic. Dr. John Harley, Physician to King's College Hospital, who has recently[2] investigated the physiological effects of atropia by experiments on man, the horse, and the dog, concludes that this agent exerts a powerful stimulant action on the heart. The experiment of Lemattre proves that this effect is not produced by paralysis of the terminal filaments of the pneumogastric; it must be due, then, to the stimulant effect upon the organic nervous system.

The character of the action of atropia on the sympathetic system may be studied by an examination of its influence over the circulation in the digital membrane of a frog. In making this observation, precautions must be used to avoid error. It is difficult, if not impossible, to make a satisfactory examination of the circulation in the digital membrane without previous division of the medulla, as recommended by Flint.[3]

Experiment.—The digital membrane being stretched, moistened with distilled water and covered with thin glass, is brought in the focus of the instrument. One vessel is kept in view and its diameter measured by an eye-piece micrometer. One fourth of a grain of the sulphate of atropia is then injected under the skin. In

[1] Gazette Hebdomadaire. Ranking's Abstract, July, 1868.

[2] Gulstonian Lectures. Medical Times and Gazette, March, 1868.

[3] The Philosophy of Man, vol. i. p. 285.

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less than a minute there occurs considerable perturbation in the movements of the corpuscles, and they pass through the vessel with increased rapidity. No change can be discovered in their form, refraction of light, or other physical qualities. A slight diminution in the calibre of the vessel under examination is observed, but this disappears after some hours, and an evident relaxation of the capillary wall and dilatation of the vessel then take place.

This experiment accords in its results, in part, with a similar one detailed by Lemattre; but this observer does not allude to the relaxation of the vessels which succeeds to the contraction. I have been unable to verify the observation of Lemattre: that application of a solution of atropia to the interdigital membrane caused a diminution in the calibre of the vessels. Meuriot has, however, observed this, as also the relaxation which succeeds to the contraction of the capillaries.

Experiment.—To determine the action of atropia on the heart. Expose the heart of a frog by dividing the sternum and opening sac of pericardium; pulsations 40 per minute. Inject one-fourth of a grain of atropia; pulsations rise in a few minutes to 52, and the contractions of the heart are increased in power. At the end of five hours, pulsations 30, but very feeble.

Experiment.— Expose the heart as in previous experiment. Apply a concentrated solution of atropia, by means of a pipette, through a small opening in the pericardium. Action rapidly diminished in power and frequency, and irritability of muscle finally destroyed.

To give more completeness to these investigations, I have applied the "graphic method" to determine the action of atropia on the heart and arteries of man. It is obvious, that if the statements herein made, in regard to the effects of atropia upon the organic nervous system are not erroneous, the sphygmograph should afford some evidence of their correctness. I do not underrate the difficulties of making reliable observations with this instrument. As Dr. Ainstie[1] has remarked in his review of Dr. Brunton's work "On Digitalis"—"sphygmographic observations by partially skilled hands are in danger of becoming a very serious mischief, as leading to all manner of fallacious conclusions."

In reporting observations made on the sphygmograph, two methods may be pursued: merely to state in general terms the conclusions to which the observer has been conducted; to give the

[1] The Practitioner, Oct. 1868.

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observations themselves so that the reader may form his own conclusions in regard to the correctness of the observations and to the proper interpretation to be given them. In using my own instruments,[1] I have attempted to avoid some of the sources of fallacy, by a careful study of the proper method of manipulating it, and I avoid misleading the reader by placing the tracings themselves before him.

A private pupil, Mr. ——, animated by an eminently scientific zeal, submitted himself to a course of experiment. In order to have a standard of comparison, I made observations before the administration of atropia. Time of observation, 6.30 P. M. Pulse, 71. Subjoined is the tracing, taken before atropia was administered:—

No. 1.

The next observation was made five minutes after $\frac{1}{78}$ of a grain of the sulphate of atropia had been injected into the arm. In

No. 2.

fifteen minutes the pulse had risen to 98, and the tracing was as follows:—

No. 3.

No. 4 represents the tracing at the end of 20 minutes; the pulse

No. 4.

then being 112. At the end of a half-hour the pulse had risen to 120, when the tracing was as follows:—

No. 5.

[1] Sphygmographe de Marey. Margaine, Constructeur, Paris.

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The first effect of the atropia as exhibited by the sphygmograph, is to increase the amplitude of the pulse wave, to diminish the arterial tension, and to lower the action of the heart. But these effects are of short duration. The other tracings exhibit a more rapid movement of the heart, and increased tension of the arteries. This increased tension is shown in the ascension, summit and declension of the wave, but especially in the diminished intensity of the dicrotism.

Closely connected with this branch of the subject is the influence of atropia on the animal temperature. ' Dr. John Harley[1] has noted an elevation of 1° F. externally in man, after the subcutaneous injection of atropia. I have made observations on warm-blooded animals and on man, which are confirmatory of the statements of Dr. Harley. The rise of temperature, 5° to 1° F., is greater on the external than in the internal parts, where the increase is rarely more than 5° F. This rise in temperature does not occur in a regular ratio with the increased pulsations of the heart, as is the case in the normal evolution of fever, where an increase of ten beats of the heart is equal to a rise of 1° F. in temperature. The explanation of Dr. Harley, who attributes the increased body heat to the increased action of the heart, is probably a true one, in a restricted sense. The capillaries are congested because an increased amount of blood is pumped into them by the heart, and the circulation in the capillaries under these circumstances is somewhat impeded, in consequence of the increased tension of the walls of these vessels. In some temperaments this determination to the capillaries is manifest by a more or less intense redness, which is sometimes called a "rash." This heightened color—for it strongly resembles the ruddy hue of youth or the sudden injection of the countenance in blushing—is not an eruption upon the skin. It is a phenomenon identical in character with the redness of the fauces, one of the most constant symptoms produced by the use of atropine. Females having a light complexion are especially liable to this suffusion of the face whether the agent be administered internally, or injected under the skin. The redness is accompanied by a subjective sensation of heat and burning, and there is found to be, on applying a thermometer, a positive increase in temperature.

The midriasis of atropia is another phenomenon pertaining to

[1] Medical Times and Gazette, March 21, 1868, p. 325.

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the action of this agent upon the nervous system. By a merely local action, atropia instilled into the eye dilates the pupil and deranges accommodation. It is obvious that this action can be accomplished through two modes only; by a local impression on the muscular tissue or on the nerves supplying the muscles. The iris having a set of radiating, and also a set of circular fibres (the sphincter muscle) innervated, the first by the sympathetic, and the second by the motor oculi; if the action of atropia were exerted on the muscles, dilatation of the pupil would not be produced, for we have no right to assume that one set of fibres would be affected in one way, and another set having the same structure be affected in another way. Irritation of the third pair (motor oculi) produces contraction of the pupil; irritation of the sympathetic produces dilatation of the pupil. Paralysis of the third pair, and hence loss of innervation of circular fibres or sphincter muscle, is followed by a dilated and motionless pupil, the action of the radiating fibres not being opposed by the circular fibres. "Most decisive," says Donders,[1] "however, are the cases of complete paralysis, because they show that this nerve (the third) is the condition, *sine quâ non*, both for reflex and accommodative movement of the pupil, and for the accommodation itself; no trace thereof remains when its paralysis is complete." The local action of atropia then is exerted on the filaments of the third and the sympathetic, just as, introduced into the blood, it has a selective action on these parts of the nervous system. It acts as a paralyzer to the third pair, and as a stimulant to the sympathetic. "The proof consists in the fact, as Ruete was the first to show, that, in complete paralysis of the oculo-motor nerve, the size of the pupil is still considerably increased by atropia; additional dilatation also occurs under atropia after the removal of the nerve in question in animals."[2] Lemattre,[3] who has elaborately examined this question, comes to this conclusion:—

"The midriasis of belladonna is not due to a paralysis, but to a muscular contraction, affecting the radiating and the vaso-motor fibres of the iris."

He rejects the opinion that paralysis of the motor oculi has anything to do with the dilatation of the pupil as produced by atropia.

The eye affected by atropia is presbyopic. This disorder of

[1] On the Anomalies of Accommodation and Refraction of the Eye. Syd. Soc. Edition, p. 578.

[2] Donders, op. cit., p. 589.

[3] Supra, p. 62.

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accommodation is differently explained by different observers. According to Graefe,[1] this effect is due to the action of atropia on the radiating fibres of the muscle of accommodation; the contraction of these diminishing the curvature of the crystalline lens and thus rendering the patient presbyopic.

Beside these effects of atropia on the radiating fibres of the iris and of the muscle of accommodation, vision is affected by it, independently of these two modes. Dilatation of the pupil renders the image on the retina blurred and indistinct; sharpness of definition is prevented by the entrance of the most refracted rays. Congestion of the retina itself interferes with the formation of the image. The first effect of atropia is to diminish the calibre of the arterioles, but as I have observed—and this observation is confirmed by Meuriot—the walls of these vessels afterward relax, permitting an increased reflux of blood. This takes place in the tunics of the eye, especially the retina, and may be observed in animals poisoned by atropia, and in man after the use of excessive doses.

The action of atropia on the sympathetic system is further exhibited in its power to promote peristaltic movements, and in the irritability of the bladder produced by ordinary medicinal doses. The former effect is chiefly therapeutical; the latter, however, is a frequent result of the physiological action of atropia. Dr. Fuller,[2] in a paper entitled "On the Administration of Belladonna and on certain Causes which modify its Action," based on observations made on twelve female children from 8 to 19 years of age, noted some difficulty in voiding urine in one case only. But children are remarkably insusceptible to the action of belladonna. My own observations show that the susceptibility to the action of atropia increases with age, and this remark is especially true of the action upon the bladder. Lemattre considers dysuria a common symptom, but especially paralysis of the bladder which he has observed many times. Meuriot[3] notes vesical tenesmus as a constant symptom after the use of large doses. The most constant vesical trouble which has happened under my observation, is a slowness and difficulty of emission. The power of the will over the sphincter has seemed to be obstructed. This may be readily comprehended by a moment's reflection upon the functions of the sphincter mus-

[1] Schmidt's Jahrbücher, Band cxii. 1861.

[2] Medico-Chirurgical Transactions, vol. xlii. p. 289 et seq.

[3] Schmidt's Jahrbücher, Band 139. Jahrgang, 1868, No. 9, p. 284.

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cle. It is partly voluntary, partly involuntary in function. The atropia I conceive to act upon the involuntary portion of this sphincter, causing it to contract and thus opposing the action of the will, or at least the consensual action of the voluntary and involuntary portions. In addition to this difficulty, which occurs in almost all cases in which the physiological effects of atropia have been induced, some dysury is produced by the dryness of the vesical and urethral mucous membrane.

The brain is but little affected by an ordinary medicinal dose of atropia. Frontal headache, fulness of the head, and giddiness, are commonly experienced. Toxic doses produce much more serious and characteristic phenomena, but I reserve the consideration of them for another part of this paper.

Secondary Effects of Atropia.—By this phrase I mean to indicate those effects of atropia which are the result of, and consecutive to, its primary action on the nervous system.

Atropia produces dryness of the skin, dryness of the mucous surfaces, and increases the flow of urine. According to Harley, it influences the secondary assimilation, promoting oxidation and the retrograde metamorphosis of tissue. The earliest symptom occurring after hypodermic injection is dryness of the lips and mouth. This extends to the fauces and larynx, producing dysphagia and aphonia in extreme cases. What is the mechanism of this arrest of secretion?

Pflüger[1] has attempted to show that there is a connection between the nerves and the nuclei of the secretory cells of the salivary glands. If this be the case, the secretion would seem to be due to immediate excitation of the gland cells and not through the agency of the vaso-motor nerves by regulating the supply of blood. V. Wittich[2] has shown that the sympathetic directly excites the secretion of the parotid, not by regulating the blood supply passing through this gland, for the influence on its secretion is the same when the flow of blood is stopped. Provost,[3] who has studied the anatomy and physiology of the spheno-palatine ganglion, has shown that avulsion of this ganglion is followed by greatly increased secretion of the Schneiderian mucous membrane. There can be no doubt, then, about the *direct* influence of the sympathetic over secretion; but the precise nature of this influence is not well

[1] Syd. Soc. Biennial Retrospect, 1867. [2] Ibid.
[3] Archiv. de Physiologie, Normale et Path. i. 7-21, and ii. pp. 207-232, 1868.

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understood. When, after the administration of atropia, the fauces are injected and the face burns, the temperature being actually elevated, there is greatly diminished secretion notwithstanding the increased amount of blood in the capillaries. This result must then be produced by the action of atropia on those filaments distributed to the secreting gland cells and not merely upon the vasomotor fibres.

The diuretic effect of atropia has been shown by Meuriot and by Harley, and has been frequently observed clinically by myself. This agent seeks an outlet through the kidneys. Congestion of the Malpighian tufts is due to its presence and to the increased arterial pressure.

The effect which Harley has noted of atropia in increasing the rate of oxidation is a secondary effect due to the increased afflux of blood into the capillaries.

Physiological Effects of Atropia as produced in Man by the Subcutaneous Injection of a Medicinal Dose—$\frac{1}{48}$ of a grain.—Locally there occurs some redness extending for a short distance around the seat of puncture, and a sensation compounded of smarting and itching. In five minutes the influence of the agent upon the action of the heart may be noted, the pulsations becoming a little slower and decidedly fuller and stronger. A bluish-white appearance of the under lip and dryness of the mouth are next experienced; then fulness of the head or a sensation of lightness, tinnitus aurium, giddiness and vertigo. The pupils begin to dilate when the dryness of the lips occurs, but do not reach their maximum dilatation until the lapse of about one hour. As the pupil dilates, the pulse quickens, rising, when the maximum effect is reached, to double or more the normal number per minute. Flushing of the face, injection of the conjunctiva, and slight dimness of vision are then experienced. Movements in walking become somewhat disorderly, owing to the vertigo, and to altered sensibility of the extremities. The dryness of the mucous membrane increases, producing dysphagia, aphonia, and difficult micturition. The urine is voided slowly and with some straining. Nausea and vomiting are apt to occur as the influence of the atropia declines. Some relaxation of the bowels also is not unusual. The last symptoms, are disorder of vision due to paralysis of accommodation, and aphonia due to the dryness and to paralysis of the muscles innervated by the inferior laryngeal.

Toxic Effects of Atropia.—Very important information as to the

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action of atropia is obtained by a study of the toxic effects in animals and in man.

When atropia is administered by subcutaneous injection to warm-blooded animals, effects are produced very similar to those I have already described as occurring in man. I have made six experiments upon cats. The results of these experiments were so uniform that I need not occupy space to give each in detail. When one-fourth to one grain of sulphate of atropia is administered to a cat, the first effect which follows is a peculiar dryness and pallor of the mucous membrane of the lips and mouth. The lips move with difficulty, and have a dry and shrivelled appearance. The eyes become dry, and the palpebral opening is diminished in size. Dilatation of the pupil then occurs. As in frogs, defects of co-ordination first appear in the hind extremities, next partial paralysis extending finally to the upper extremities. When paralysis in all the extremities ensues, sensibility is not abolished. Even when complete anæsthesia of the cornea is produced, and no reflex movements of the eyelids can be excited, irritation of the roof of the mouth causes reflex movements of the jaws. The action of the heart is always considerably increased and the temperature elevated. A thermometer placed in the rectum exhibits an average rise in temperature of one-fourth of 1° F., whilst on the surface, the average increase of temperature is 1° F. Defects of vision, paralysis of accommodation, occur, as may be seen in the failure of the animal to avoid any obstacle, as a table leg. Hallucinations also occur, as evidenced by such movements as watching imaginary objects in the air, moving the head to avoid contact with them, and raising the fore-legs to strike. Injection of the conjunctivæ takes place, and the dryness of the eye yields to lachrymation. Urine and feces are passed when poisonous effects are fully manifest. The urine instilled into the eye of another cat causes dilatation of the pupil.

The pupil contracts at the moment of death. The body is completely relaxed immediately after death, but extreme post-mortem rigidity sets in in a half-hour.

The morbid appearances after death are, congestion of the meninges and of the choroid plexus, congestion of the lungs, the large venous trunks gorged, and the left cavities of the heart empty.

The symptoms of poisoning, as observed in man, closely correspond to those which I have described as occurring in animals. To avoid tiresome details, I give, in the briefest manner, those symptoms of poisoning which I have happened myself to observe,

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together with an analysis of such as have been reported by others. The following are the toxic effects of atropia as observed in man:—

Extreme dryness of the mouth; retraction of the lips; dysphagia and aphonia, consequences of the dryness of the mucous membrane, and paralysis of the pharyngeal and laryngeal branches of pneumogastric. Pupils largely dilated; conjunctivæ dry; eye prominent and brilliant; presbyopia; dimness of sight; spectral illusions; blindness. Hallucinations; pleasing delirium, sometimes maniacal excitement, sometimes stupor; vertigo; paralysis of sensory nerves; trembling; loss of cöordinating power; paralysis of motor nerves. Rapid pulse; rise in external temperature; flushing and burning of face. Frequent micturition; strangury; involuntary discharge of feces.

After death, extreme post-mortem rigidity; congestion of the meninges of the brain; congestion of the lungs; fulness of the great venous trunks; empty left cavities of the heart.

Conclusions.—Sufficient data have now been accumulated to enable me to state somewhat more definitely the nature of the phenomena produced by atropia.

By Lemattre, atropia is supposed to have a selective action upon the cerebral lobes, the pons, and especially upon the gray matter of the spinal cord. It has been shown that atropia has a special affinity for nervous matter. It cannot be doubted that atropia circulating in the blood affects, more or less, all parts of the nervous system. Indeed, the result of its action confirms this view. Delirium, loss of sensibility and motility, abolition of the special senses, show the influence of atropia upon the nervous system of animal life. The hallucinations, the fantastic images, the illusions are, in part also, due to deranged accommodation, to the presbyopia, and to the indistinctness of images in consequence of congestion of the retina.

The cerebral phenomena produced by it seem to me largely dependent upon the increased amount of blood which is pumped into the brain—congestion of the meninges being the principal lesion found after death. An altered state of the functions of the brain is the result of increased blood supply. Two factors are concerned in the causation of this congestion: increased arterial tension, and increased *vis-à-tergo*. It is obvious that mere congestion of the meninges and of the choroid plexus could not produce the phenomena characteristic of atropia poisoning. To this con-

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dition must be added the direct impression of atropia upon the secreting cells of nervous matter.

Further, the facts show that whilst atropia acts as a depressor of the cerebro-spinal nervous system, it increases the functional activity of the organic nervous system. This latter influence is exhibited in the contraction of the radiating fibres of the iris; in the diminution in calibre of the arterioles; in the increased action of the heart; in the rise in bodily heat; in the irritability of intestines and bladder.

After a time, greater or less, according to the quantity administered, atropia exhausts the excitability of the organic nervous system, and a state of depression succeeds to the increased functional activity. If this were not so, it is difficult to conceive how atropia could produce a fatal result, except in enormous doses, for one class of actions is opposed to the other. A correct appreciation of these actions is of great importance in determining the nature of the physiological antagonism between atropia and other narcotics.

CHAPTER II.

ATROPIA AND PHYSOSTIGMIA.[1]

THE opposite effects of atropia and physostigmia on the pupil are so striking, that a physiological antagonism extending throughout the whole range of their action, would seem to be probable. The dilatation of the pupil as produced by atropia is due, as shown in the preceding pages, to contraction of the radiating fibres of the iris. As the circular fibres of the iris are innervated by the third pair, the contraction of the pupil produced by physostigmia must be due, either to paralysis of the sympathetic or to excitation of the sphincter muscle. These two agents must, therefore, act oppositely upon the sympathetic system, or one must act upon the sympathetic and the other upon the nervous system of animal life.

Dr. Fraser,[2] of Edinburgh, has published an admirable paper

[1] The Physostigmia (calabarine) employed in these researches was made by Merck, of Darmstadt, who enjoys a deservedly high reputation on the continent of Europe for his pharmaceutical preparations.

[2] Abstract of Dr. Fraser's paper in American Journal of the Medical Sciences, April, 1868.

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upon the physiological effects of the extract of Calabar bean. I shall avail myself of his very exhaustive labors, assuming that what he has informed us of the action of Calabar bean is entirely correct. I take this position the more readily, because my own observations with this agent are entirely in accord with Dr. Fraser's. In order to a more ready comprehension of the reactions which ensue when these two agents are conjointly administered, I place in parallel columns the principal physiological effects of each:—

ATROPIA.	PHYSOSTIGMIA.
A spinal paralyzer.	A spinal paralyzer.
Destroys excitability of motor nerves.	Destroys excitability of motor nerves.
Destroys the muscular irritability.	Preserves the muscular irritability.
Destroys the excitability of the sensory nerves.	Increases rather than diminishes the excitability of the sensory nerves.
Increases the action of the heart and the arterial tension, by an excitation of the sympathetic. Increases action of heart after division of pneumogastric.	A large dose produces cardiac syncope; action of heart ceases in diastole. This effect is not produced through the pneumogastric, although this nerve is ultimately paralyzed, for it follows when the pneumogastric is divided, nor does it result from paralysis of respiration. The cardiac syncope is due to a direct action on the cardiac ganglia.
	Diminishes arterial tension.
Increases respiratory movements.	Paralyzes muscles of respiration.
Dilates the pupil.	Contracts the pupil.

We have now the data for estimating the influence which these agents exert upon each other, when administered together.

Experiment.—Injected under skin of a frog 80 minims of a solution containing $\frac{1}{78}$ of a grain of physostigmia and $\frac{1}{24}$ of a grain of atropia. In fifteen minutes there was complete paralysis of the hind extremities and partial paralysis of arms. Sensation was not abolished, for when the skin was pricked, or muscles pinched, the frog attempted to escape. Soon after, however, on pinching an extremity the limbs were agitated by violent tetanic spasms, especially the upper. A slight tap on the back produced these effects: closure of eyelids, a sharp cry, opisthotonos, and tetanic rigidity of the limbs. Meanwhile the frog lay completely relaxed without the least motion. When taken by the head and raised up, the limbs hung down perfectly flaccid. A quick sudden blow, however, induced the tremors and the tetanic shocks. He lay in this condition a half hour apparently dead, when I inserted under the skin of the thigh $\frac{1}{4}$ of a grain of the sulphate of atropia. Re-

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turning to the room after an absence of two hours, I found that all the toxic symptoms had disappeared; the frog jumped and was as active and lively in every respect as before the experiment commenced.

Experiment.—Injected as before under the skin of a frog $\frac{1}{16}$ of a grain of physostigmia. Paralyzing effects were manifest in three hours. Then injected $\frac{1}{12}$ of a grain of atropia (sulphate). Soon after the atropia was administered, the frog, when struck a quick, slight blow, uttered a cry, and was agitated by sudden tonic contractions of all the muscles. Slow and gradual pressure with the fingers did not produce these tetanic convulsions, but a quick tap on any part of the body gave rise to them. Then injected an additional $\frac{1}{12}$ grain of sulphate of atropia. A succession of tremors soon after agitated all of the muscles, especially those of the thigh, the limbs and body being all the time perfectly limp and flaccid. When the tremors ceased, no tetanic spasms could be induced by a blow upon any part of the body. The frog then became entirely insensible to irritants, and appeared to be without life. On opening the chest, however, the heart was found to be pulsating strongly and equably 52 per minute.

Experiment.—To a cat administered $\frac{1}{8}$ of a grain of sulphate of atropia by subcutaneous injection. The usual toxic effects manifested themselves in a few minutes: dryness of mouth; redness and injection of the fauces; dilatation of pupils; partial paralysis of hind extremities; sensibility to touch, to pain, and especially to temperature diminished; reflex movements normal. Injected then $\frac{1}{8}$ of a grain of calabarine. In five minutes decided contraction of the pupil occurred; paralysis of all the muscles of animal life took place so that the cat hung perfectly limp and flaccid when suspended by the ears; occasional tremors, especially of the limbs, and slight tetanic spasms on irritation of surface occurred, notwithstanding the complete paralysis; respirations grew slower and slower, and after the lapse of three hours occurred only at the rate of one in five minutes; action of heart continued, but gradually lost power and diminished in frequency of pulsations; complete anæsthesia of cornea; reflex and accommodative movements of the eye finally abolished. Respiration ceased before action of heart.

In subsequent experiments I varied the proportions of atropia and calabarine (physostigmia) in order to ascertain how far these agents were antagonistic as to toxic power. Thus to a large and powerful cat I administered by hypodermic injection $\frac{1}{2}$ of a grain

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of sulphate of atropia, and $\frac{1}{24}$ of a grain of physostigmia. The symptoms of atropia poisoning were first manifested, and afterward the effects characteristic of physostigmia, without, however, producing a fatal result. In corresponding doses physostigmia is more powerful than atropia; hence in order to obtain a balance of physiological effects, sufficient atropia must be administered to produce some dilatation of the pupil, and as physostigmia is slower and also longer in action, the effect of the atropia must be maintained by continued use. If a quantity of physostigmia, just sufficient to produce a fatal result, be administered, its toxic power may be counterbalanced by atropia given so as to maintain a slight degree of dilatation of the pupil. Large quantities of both these agents, administered simultaneously, so overpower the nervous centres (the cerebrum and respiratory centre) as to destroy life.

The results then of the study of the mutual reactions which obtain between atropia and physostigmia when administered together, may be stated as follows:—

Atropia and physostigmia are not antagonistic as regards their action upon the muscular system of animal life—paralysis being induced by both. Atropia produces paralysis by destroying the muscular irritability and the excitability of the motor nerves; physostigmia by paralyzing the spinal cord.

Atropia and physostigmia are antagonistic as regards their action on the sensory nerves; atropia destroying and physostigmia heightening the sensibility of these nerves.

They are antagonistic as to their influence over the respiratory movements; atropia increasing and physostigmia retarding them.

They are antagonistic in their action upon the heart; atropia producing excitation of the cardiac ganglia, and physostigmia paralyzing these ganglia.

They are opposed in respect to their action on the sympathetic; atropia producing increased action of the sympathetic; physostigmia paralyzing this system.

They have opposite effects on the pupil in virtue of opposite effects on the sympathetic; atropia dilating the pupil by its action on the radiating fibres of the iris; physostigmia contracting the pupil by paralyzing the radiating fibres.

A very singular effect, which I was not prepared to find, is the peculiar exaltation of the reflex faculty produced in frogs, when these agents are administered together—a sudden irritation of the surface causing tetanic rigidity like electric shocks, the muscles

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immediately afterward resuming their very relaxed and flaccid condition. Atropia sensibly weakens, although it does not abolish entirely, the reflex faculty; physostigmia destroys the reflex faculty; yet the combination of the two agents produces effects not unlike those of strychnia. The analogy is preserved even after death, for post-mortem rigidity sets in at once and is very decided. The tetanic spasms must not be confounded with the tremors which are characteristic of physostigmia. These tetanic spasms are less marked in warm-blooded animals, but they nevertheless occur to a limited extent, and after death a marked degree of rigidity exists, the head and neck being curved back and the feet turned in.

CHAPTER III.

ATROPIA AND STRYCHNIA.

As atropia produces paralysis and strychnia tetanic rigidity of the muscles, these agents may be supposed to possess properties physiologically antagonistic. The distinctive effect of strychnia is to increase the reflex excitability of the spinal cord. Schroeder Van der Kolk[1] has shown that it has a selective action upon the medulla oblongata, causing dilatation of the minute vessels. This is in accordance with the opinion of Brown-Séquard, who considers the peculiar properties of strychnia due to increased nutritive activity of the cells of the cord resulting in an exaltation of the reflex faculty. Strychnia does not destroy the excitability of nerves, or the irritability of muscle. In all of these respects the actions of strychnia are opposite to those of atropia, except in respect to the reflex faculty—for as my experiments on warm-blooded animals prove, atropia does not abolish the reflex faculty of the spinal cord.

I have undertaken a series of experiments to determine the nature of the reactions which ensue when atropia and strychnia are conjointly administered. I employed cats for these experiments. The results were so uniform that I need not waste space in a recital of the details of the experiments.

[1] On the Minute Structure and Functions of the Medulla Oblongata, Syd. Soc. Ed.

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Experiment.—Injected under skin of a kitten $\frac{1}{12}$ of a grain of atropia (sulphate) and $\frac{1}{20}$ of a grain of strychnia (nitrate). The usual symptoms of atropia poisoning followed in five minutes; dilatation of the pupil; retraction of lips and dryness; dryness of mouth and conjunctivæ; injection of fauces; disorders of movement (loss of co-ordination); partial paralysis of extremities. At the end of ten minutes, muscular twitchings began at the seat of puncture and radiated from that spot over the body. The spasms were clonic in character and irregular. When the cat was not disturbed, her chief distress seemed to be from the atropia, but when required to move, she ran violently across the room, her extremities and tail agitated by strong convulsive tremors. A strong convulsion produced death by spasm of muscles of respiration in about fifteen minutes after the injection. The body remained quite flaccid for a half-hour after death, when decided post-mortem rigidity occurred. Pupils remained dilated.

The same facts were developed by several experiments. We learn from these that atropia and strychnia are not antagonistic as to toxic power, for although some of the phenomena of strychnia poisoning were modified, yet the fatal result was not prevented—not even postponed. Atropia acted more speedily. The strychnia injection did not affect the symptoms produced by atropia. The local action of the strychnia, the spasms commencing at the site of the injection, is an interesting fact. The spasms themselves, were modified by reason of the paralyzing action of atropia on the motor nerves and the muscular irritability.

Dr. Spence,[1] of Edinburgh, who has lately investigated the physiological effects of strychnia, thinks that erroneous notions have existed in regard to the quantity of strychnia necessary to produce death in the cold-blooded animals, and hence the conclusions which have been formed as to the antidotal power of woorara and nicotine, are fallacious. Dr. Frazer has shown that Calabar bean is the physiological antagonist of strychnia. Theoretically considered, a combination of atropia and physostigmia would seem to fulfil the indications more perfectly, but practically we find that atropia and physostigmia produce tetanic rigidity strongly resembling that caused by strychnia.

In a case of paralysis—hemiplegia—accompanied by *late rigidity*, as Dr. Todd[2] has styled it, I have injected simultaneously $\frac{1}{48}$

[1] Medical Times and Gazette, June 16, 1866.

[2] On the Nervous System. Am. Ed.

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of a grain of atropia and the same quantity of the nitrate of strychnia. The two agents under these circumstances produced their characteristic effects, apparently uninfluenced by each other. The rigidity, as well as the hyperæsthesia which accompanied it, were relieved by the atropia. These states of the paralyzed parts had not been affected by previous injection of the strychnia alone.

CHAPTER IV.

ATROPIA AND PRUSSIC ACID.

It has recently been asserted by M. Preyer[1] that atropia is the physiological antidote to prussic acid. He was conducted to this conclusion by reflecting upon the mode in which prussic acid produces death. As prussic acid in large doses causes paralysis of the heart, he assumed that an agent which would paralyze the pneumogastric, the inhibitor nerve of the heart, and at the same time "stimulate the central nervous apparatus of respiration" would prove to be the true physiological antidote. He, however, prudently restricts the use of atropia to those rare cases of poisoning by prussic acid, in which "there is apnœa and the heart remains beating."

There are various theoretical considerations opposed to this view. Piotronosky[2] affirms that he has produced tetanic spasms of the heart and wrinkling in the transverse folds of its external fibres, by direct irritation of the vagus. This experiment is submitted in proof of the statement that the external fibres of the heart are innervated by the vagus and the internal by the sympathetic. If this be the case, it is obvious that an agent which simply paralyzes the terminal filaments of the pneumogastric, would not supply the effect required. Moreover, division of the pneumogastric produces decided slowness of respiration, after having for a short period quickened it somewhat. Further, atropiá has little influence over the respiratory movements. Its real power consists in excitation of the cardiac ganglia of the sympathetic, and whatever of physiological antagonism there is between atropia and prussic

[1] The Practitioner, Aug. 1868.

[2] Sydenham Society Biennial Retrospect, 1867, p. 123.

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acid must be referred to the difference in their action upon the heart.

Theoretical considerations must yield to the demonstrations of experiment. Mr. Preyer has demonstrated on rabbits and guinea pigs, that the subcutaneous injection of small quantities of atropia is an unfailing antidote to prussic acid if employed quickly after the injection of the acid. I have submitted this statement to the test of experiment.

Experiment.—I passed into the throat of a pigeon, by means of a pipette, 5 minims of medicinal prussic acid (U. S. P.) and immediately injected $\frac{1}{24}$ of a grain of sulphate of atropia. The bird had in a few minutes convulsive movements of the head, neck and eyelids; fell down, and expired in a general convulsion of a tonic character.

The fatal result in the preceding experiment may be attributed to the atropia. In order to obviate this objection, I changed the order of administration of these agents. As pigeons are not very susceptible to the action of atropia, I also increased the quantity administered by subcutaneous injection.

Experiment.—Administered to a pigeon by subcutaneous injection one-eighth of a grain of atropia. When the influence of this began to be manifest, passed into the gullet by a pipette, 5 minims of the medicinal hydrocyanic acid. Death ensued precisely as in the first case.

It may be urged against these experiments that pigeons are not suitable subjects. As cats are readily affected by both these agents, in my subsequent experiments I employed these animals. The details of the experiments and the results being so uniform, I need narrate but one as a type of all.

Experiment.—Administered by subcutaneous injection to a cat one-fourth of a grain of atropia. When the symptoms characteristic of atropia poisoning were produced, I poured into the gullet 10 minims of medicinal hydrocyanic acid. The cat fell upon her side, had a few convulsive twitches of the extremities, uttered a sharp cry and expired.

In these experiments on cats, I preferred to bring them under the influence of atropia before administering the prussic acid, because of the great difference in the rapidity with which these agents act. If there really existed a true physiological antagonism between them, there could be no difference in result whether atropia or prussic acid were first administered. It is clear, I think,

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that no such antagonism exists as supposed by M. Preyer, but it may be admitted that atropia will be useful in counteracting the depression of the heart's action in those rather exceptional cases in which the symptoms of poisoning are delayed, or in those cases in which just sufficient prussic acid has been administered to produce dangerous symptoms, there being time enough to employ cardiac stimulants.

CHAPTER V.

ATROPIA AND MORPHIA.

THE physiological antagonisms examined in the preceding chapters, are by no means equal in interest and practical importance to those now to be examined, between atropia and morphia. Although the subject of the antagonism of atropia and morphia has been studied with extraordinary diligence and success, it cannot be said that all questions in respect to it have been definitely settled. I, therefore, venture to offer some additional observations on this important topic.

There are yet those who deny that any real antagonism exists between morphia and atropia. Thus, Dr. John Harley,[1] one of the most recent investigators, concludes that "as far as a hypnotic influence is concerned, belladonna decidedly increases the effects of opium, and, on the other hand, opium invariably intensifies not one or two, but *all* the effects of belladonna."

Also Dr. Brown-Séquard,[2] who says that "death by opium takes place from the same dose whether we simply employ belladonna or not. These experiments clearly establish that the toxic effects of these poisons, in certain animals at least, do not neutralize each other." The same conclusion is arrived at by Onsum.[3] Dr. Bois.[4] who has lately examined this question experimentally by the successive injection of large doses of atropia and morphia, affirms that

[1] Gulstonian Lectures, Medical Times and Gazette, April 4, 1868.

[2] Lectures on the Diagnosis and Treatment of Functional Nervous Affections, Phila., 1868. Part I. p. 78, foot-note.

[3] Schmidt, Jahrbücher, vol. 128, p. 288.

[4] Gazette des Hôpitaux. Quoted by Lemattre, Arch. Gén. Anat., 1865.

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the toxic effects of these agents are increased by simultaneous use. Such is the conclusion, indeed, of all experimenters who have studied the effects of atropia and morphia in animals. Notwithstanding the unanimity on this point, I have made a series of experiments to satisfy myself. I need not waste space by narrating these experiments in detail.

Experiment.—When full doses of atropia and morphia—one-eighth of a grain of the former, and one grain of the latter—are administered by subcutaneous injection to a kitten, the effects of the atropia are first manifested. In five minutes pupils dilate, lips grow dry and retract, and fauces become red. Loss of power in hind extremities occurs soon after. The animal utters loud cries in a somewhat husky voice at intervals. Respiration grows hurried and action of the heart increases. The animal manifests great uneasiness and alarm, and runs to and fro without object, striking against chair and table-legs. The limbs in running are agitated by irregular convulsive movements. Reflex movements of the eyes become slow and feeble, and finally are abolished. Rhythmical movements of the jaws, and rapid striking of the teeth, with frothing at the mouth, are observed. The especial sensibility of the auditory nerve is heightened, so that the least noise alarms the animal, and she rushes to and fro to escape the imaginary danger, the movements of the limbs being disorderly and little under control. Sensibility is much diminished. Death occurs in about two hours in a convulsion, after a more or less prolonged period of deep somnolence.

Atropia and morphia uniformly produce a fatal result, when administered in toxic doses to cats. I find, however, that if a dose of morphia just sufficient to destroy life be administered, a fatal result may be prevented by the use of atropia. This result, so opposed to the observations of other experiments, needs explanation. My method of proceeding in order to determine this, was to administer one grain of sulphate of morphia, and then to await the development of the toxic effects before injecting the solution of atropia. I then injected a small quantity of atropia—$\frac{1}{48}$ of a grain—sufficient to cause a slight degree of dilatation of the pupil. This amount was injected from time to time—two or three times—so as to maintain the full effect of the atropia without at any period suddenly charging the nervous centres with an amount of the toxic material too great for them to bear. Proceeding in this way carefully, I found that the toxic effect of morphia may be overcome,

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the animal suffering at last only from the physiological effects of atropia—dryness of mouth, dilatation of pupil, injection of conjunctivæ, and some disorders of sensation and voluntary movement. If great care be not exercised in the use of the atropia, the life of the animal will finally be destroyed by this agent, for the effects of this last much longer than those of morphia. Sufficient atropia only is necessary to maintain the action of the heart and the peripheral circulation, and not in such quantity as to overwhelm the brain. The state of the pupil is the guide, but the too common error of giving sufficient atropia to cause extreme dilatation of the pupil, should not be committed: the contraction of the pupil caused by morphia should only be overcome. In other words, the toxic effects of atropia should not be superadded to the morphia poisoning.

Atropia acts against morphia poisoning, by promoting elimination. This action was long ago pointed out by Bernard, in his study of the antagonism between curara and strychnia. "Curara," says Bernard, "promotes the elimination of strychnia, by the increased activity which it gives to all the secretions, especially the urinary secretion." In my experiments on cats I have sought to give the atropia at a period, in the course of the toxic symptoms produced by morphia, most favorable for elimination. The arrest of the urinary secretion produced by morphia, and the increased activity of the kidneys caused by atropia, are capital points in respect to the physiological antagonism of opium and belladonna.

The reciprocal influence which atropia and morphia exert upon each other has been elaborately studied by trials upon man. When $\frac{1}{4}$ of a grain of morphia and $\frac{1}{96}$ of a grain of atropia are injected under the skin, the following are the phenomena observed: a sense of depression at the epigastrium; gurgling of the intestines (borborygmi); slight nausea; a feeling of distension of the brain, with a rushing noise in the ears and vertigo; dryness of the lips, and afterwards of the mouth and fauces; voice husky; swallowing difficult; no change of the diameter of the pupil; pulse increased somewhat in frequency and in volume; respirations deeper and a little slower; the fulness of the head and the vertigo, increased so that locomotion becomes uncertain and staggering; itching of the whole cutaneous surface; bladder irritable and emission of urine slow and difficult; more or less somnolence, and in some persons sleeplessness, but a feeling of great comfort and freedom from suffering; perspiration; nausea and vomiting; dizziness; mental hebetude; muscular soreness and weakness.

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The foregoing phenomena are mentioned in the usual order of their occurrence. The effects of the injection last from twelve to eighteen hours, according to the susceptibility of the individual. In many persons, the first impression of the atropia and morphia is marked by nausea and vomiting, but this is much more frequently the case with morphia alone. As the influence of the injection declines, some persons experience great nausea, often vomiting, vertigo, and general *malaïse*. But these unpleasant effects are rather due to idiosyncrasy, and are observed in but a small proportion of those operated upon.

The period within which, after the injection is administered, the peculiar effects begin to be manifest, varies a little in different individuals according to their susceptibility. In those accustomed to the influence the impression does not occur so early, and comes on in an equable and orderly manner; on the other hand, those unaccustomed to it feel the action quickly—in a few seconds—and the maximum effect is attained in fifteen minutes. The effect of the morphia declines first. Dryness of the mouth, aphonia, and a slight degree of dilatation of the pupil remain after the effects of the morphia have ceased. The hypnotic effect is a prominent result. This is a more constant result of the use of atropia and morphia than of morphia alone.

A very important question is the influence of morphia and atropia when conjointly administered, upon the action of the heart and the arterial tension. Atropia, as has been distinctly shown in a previous part of this paper, greatly increases the action of the heart and the arterial tension. According to Mitchell, Morehouse, and Keen,[1] morphia does not counteract the stimulant action of atropia on the pulse. Erlenmeyer,[2] on the other hand, states that although they do not wholly counterbalance each other's effects on the pulse, yet the stimulant action of the atropine when given alone is so modified that an effect intermediate between the depression caused by morphia and the excitement caused by atropia, is the result. Harley[3] asserts that atropia overcomes the depression of the heart's action caused by morphia. He attributes this result to the fact that the powerful stimulation of the sympathetic exerted by atropia, overcomes the derangement of the vagus nerve pro-

[1] American Journal of the Medical Sciences, July, 1865.

[2] Die subcutanen Injectionen der Arzneimittel, von Sanitätsrath Dr. Erlenmeyer, Leipzig, 1866, p. 58.

[3] Medical Times and Gazette, op. cit., April 4, 1868.

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duced morphia. My own observations are opposed to those of Mitchell, Morehouse, and Keen, and confirmatory of those of Erlenmeyer and Harley. In order to place these conclusions before the reader in a more satisfactory manner, I subjoin some sphygmographic tracings. For the purpose of comparison I give some tracings showing the action of atropia when administered alone.

No. 1.

No. 1. Before atropia; pulse 75.

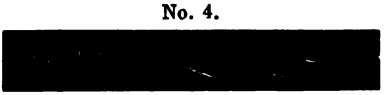
No. 2.

No. 2. In forty-five minutes after atropia; pulse 112.

No. 3.

No. 3. Before atropia—another patient.

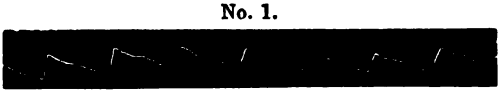
No. 4.



No. 4. In five minutes after atropia.

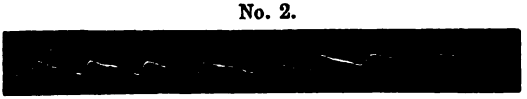
The next tracings were taken from a patient to whom had been administered, by subcutaneous injection every night for two months, $\frac{1}{2}$ grain of sulphate of morphia and $\frac{1}{2}\frac{1}{4}$ of a grain of sulphate of atropia.

No. 1.



No. 1. Before atropia and morphia; pulse 76.

No. 2.



No. 2. In twenty minutes after atropia and morphia; pulse 96.

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No. 3.

No. 3. In twenty-five minutes after atropia and morphia; pulse 96.

The difference between the action of atropia alone and atropia and morphia, as exhibited by the sphygmograph, may be stated as follows:—

Atropia.	Atropia and Morphia.
First increases length of pulse-wave and afterwards decidedly diminishes it.	Length of wave slightly diminished.
The ascent of the wave is less abrupt, the summit more rounded, and the descent more gradual.	Little effect upon character of wave.
The dicrotism diminished in intensity.	Dicrotism not at all or but slightly affected.

These results may be formulated as follows: atropia increases the cardiac movements and raises the arterial tension; morphia moderates the increased action of the heart, and counterbalances, although not wholly, the increased arterial tension produced by atropia.

As many of the secondary effects of atropia are due to the increased rapidity of the circulation and increased arterial tension produced by it, morphia within certain limits will exert a modifying influence upon these effects. The delirium produced by atropia is largely dependent upon the altered state of the intra-cranial circulation. Morphia by decreasing the number and force of the cardiac pulsations and by lowering the arterial tension, lessens so much of the cerebral effects of atropia as may be due to the changes in the intra-cranial circulation produced by the latter. These physiological conditions find expression in the greater hypnotic, but less toxic power of morphia and atropia, than of atropia alone. In my observations on animals and on man more or less deep somnolence was produced by the conjoined use of atropia and morphia. Brown-Séquard[1] affirms that these agents are antagonistic as regards their effects upon the brain, and that "in consequence of this antagonism the dose of opium to procure sleep ought to be greater than usual if belladonna is employed with it." According to Drs. Mitchell, Morehouse, and Keen,[2] "the cerebral symptoms caused by either

[1] Diagnosis and Treatment of Functional Nervous Affections, op. cit. p. 79.
[2] Am. Journal of the Medical Sciences, op. cit.

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drug are, to a great extent, capable of being overcome by the other." The same opinion has been expressed by Erlenmeyer.[1] Those who have seen cases of opium or belladonna poisoning in which the physiological antidote was employed, have been conducted to the same conclusion. I have already quoted the statements of Harley,[2] that "opium intensifies not only one, but *all* of the effects of belladonna." In another place he states a fact which I am able to confirm, that patients who cannot be made to sleep by opium, are made to sleep by opium and belladonna combined. An instructive case has happened under my observation, which seems to me to illustrate some of these disputed questions.

A feeble patient, suffering under phthisis, had a harassing cough for which I administered hypodermic injections of morphia. The effect not being sufficient, I increased the dose, and as the event proved, incautiously. At 9 P.M. I gave him 30 minims of a solution of 16 grains to the ounce=1 grain. In ten minutes he fell asleep sitting up in bed and in the act of talking to his wife. She, surprised at the sudden effect, but not alarmed, laid him down. At the end of two hours, observing that he breathed slowly and was very pallid, she attempted to arouse him, but found that he was entirely unconscious. I saw him at 12 M. when he was in the following condition: breathing slowly and irregularly—10 per minute; pulse 60 and very feeble; could not be roused; pupils contracted and eyes turned up; no reflex movements of eyelids could be induced by any irritation; skin cool and perspiring. I waited a half-hour and then tried to arouse him by shouting in his ear and by irritation of his skin; no effect was produced, but the coma was evidently deepening and his vital powers failing. I could not put in force the usual measures for relief of opium narcosis, owing to his extreme debility. Without attempting any other expedient, I injected $\frac{1}{24}$ of a grain of sulphate of atropia and awaited with some anxiety its action. In fifteen minutes his pulse rose to 80; his skin grew warm and dry; his face flushed a little; pupils dilated, and the conjunctivæ became somewhat injected. In a half-hour he began to cough, and manifested a sense of suffering by corrugation of the eyebrows; his respirations had then risen to 14, and were more regular. In two hours reflex movements of the eyelids could be exhibited by touching them; but he could not

[1] Die subcutanen Injectionen der Arzneimittel, op. cit.

[2] Medical Times and Gazette, April 4, 1868, p. 377.

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yet be roused. He continued to sleep until 4 P.M., when he was easily awakened, but he remained in a more or less somnolent condition for twelve hours longer. The whole duration of the period of narcosis was twenty hours, during which he was entirely unconscious, and insensible to irritants. His conjunctivæ were injected, his mouth dry and his voice husky, and his vision disordered at the end of forty-eight hours. During the period of narcosis, no evacuation took place, but at the end of twenty hours he passed a large quantity of urine, but slowly and with difficulty.

The facts in the foregoing case are all the more satisfactory, because no other means of treatment were, or, indeed, could be adopted. There can, therefore, be no question as to the influence of atropia in counteracting many of the effects produced by the morphia. The action of the morphia appeared to be modified by the atropia in respect to—

1. The state of the pupil.
2. The action of the heart.
3. The arterial tension.
4. The respiratory movements.
5. The temperature, or body heat.
6. The circulation and functions of the skin.
7. The reflex faculty.

The action of the morphia was either not affected or increased by the atropia in respect to—

1. The hypnosis.
2. The dryness of the mouth.
3. The dysphagia and aphonia.
4. The dysury.

The effects of $\frac{1}{24}$ of a grain of atropia lasted twelve hours longer than those produced by one grain of morphia. The last effect to disappear was the disorder of accommodation. My patient complained of dimness and uncertainty of vision, and was presbyopic when all the other phenomena had disappeared. The dimness of vision appeared to be in part due to congestion of the fundus of the eye, for this symptom persisted so long as the injection of the conjunctivæ continued. In a patient, already referred to, to whom I gave hypodermic injections of atropia and morphia for several months, the presbyopic state continued notwithstanding these agents counterbalanced each other, as respects the state of the pupil, showing that although morphia produces spasm of the

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muscle of accommodation, as stated by Græfe, yet atropia overcomes this.

Conclusions.—Atropia and morphia, when administered simultaneously, or one during the action of the other, exert a distinctly modifying influence upon each other.

They are antagonistic as regards their action on the pupil, but morphia does not overcome the presbyopia caused by atropia.

They are to a certain extent antagonistic in their action on the heart; morphia diminishing the stimulant effect of atropia, producing an effect intermediate between the slow pulse of the one and the quick pulse of the other.

Morphia slows the respiration and atropia quickens it; when administered together, the result is an action intermediate.

Morphia does not counterbalance the redness of the skin, its increased temperature, and the general rise in body heat produced by atropia. The sweating caused by morphia is prevented by atropia. Morphia diminishes but does not prevent the increased arterial tension caused by atropia.

When administered by subcutaneous injection, atropia diminishes the sickness, and prevents the depression of the heart's action, caused by morphia.

Atropia intensifies the purely hypnotic effect, but diminishes the coma and relieves the insensibility produced by morphia.

They are not antagonistic, but allies in their effects upon pain.

Morphia does, and atropia does not, destroy the reflex faculty.

The dryness of the mouth, the dysphagia and aphonia of atropia are not diminished but increased by morphia.

They are antagonistic in their action on the intestinal canal; morphia constipating and atropia relaxing the bowels.

The dysury caused by atropia is not relieved by morphia.

They are antagonistic as regards their action on the kidneys; atropia increasing and morphia diminishing the flow of urine.

They differ in the period of access, and in the duration of the symptoms respectively caused by them; atropia acts more speedily, and its action continues longer.

So far as these agents are capable of counterbalancing each other, the effect of $\frac{1}{24}$ of a grain of atropia is equal to one grain of morphia.

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PART II.

THERAPEUTICS OF ATROPIA.

CHAPTER I.

ATROPIA ALONE AND IN COMBINATION.

FROM the point of view of rational therapeutics, the study of the actions of atropia is very satisfactory; for upon existing knowledge of its physiological effects are based its best established therapeutical uses. It is no part of my purpose to discuss those uses of atropia—the offspring of a blind empiricism—which have no support in any of its physiological actions. I therefore pass over those so-called *alterative* effects which have been attributed to it, because they are too little supported by authentic clinical facts. I also pass over those uses of atropia so important to the ophthalmologist, not only in respect to the operations upon, but in the diseases of the eye. This branch of the subject I confess my incompetence to treat in a satisfactory manner.

As a Remedy for Cardiac Neuroses.—Dr. Harley,[1] considers atropia a valuable cardiac stimulant. It is especially adapted to cases in which beside a feeble action of the heart, the capillary circulation is slow and imperfect. Its use is contraindicated in narrowing and obstruction of the aortic orifice, and in cases of mitral disease with dilated right cavities, as I have ascertained by personal observation, for, under these circumstances, greater rapidity of the circulation only increases the existing cardiac lesions and adds to the distresses of the patient. It is a suitable cardiac stimulant in those conditions of depression, the causes of which are not resident in the heart itself, such as poisoning by organic alkaloids, in which the chief danger consists in a paralysis of the heart. So also the depression consequent upon severe injury, or surgical operations, may be relieved by the use of atropia. Since Dr. Greene of this country proposed the use, subcutaneously, of morphia to prevent

[1] Medical Times and Gazette, op. cit.

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the sickness and depression which follow the inhalation of chloroform, I have employed atropia with a little morphia for the same purpose. This was a very valuable suggestion, but it is capable of wider usefulness than Dr. Greene indicated. The subcutaneous use of atropia before the administration of chloroform, lessens the dangers of paralysis of the heart, and of respiration. In order, therefore, not only to prevent the after ill-effects of chloroform inhalation, but to obviate the dangers of the inhalation itself, administer by subcutaneous injection $\frac{1}{60}$ of a grain of atropia, and $\frac{1}{8}$ to $\frac{1}{4}$ of a grain of morphia, ten or fifteen minutes before commencing inhalation. If, however, it may be considered desirable only to prevent the after-effects of chloroform inhalation, administer the above-named quantities before the effects of the anæsthetic have passed off. In most cases the anodyne effects of the hypodermic injection are equally desirable. Not only is there no antagonism between the chloroform anæsthesia and the pain-relieving and heart-sustaining influence of the atropia and morphia, but they mutually aid each other. The patients observed by me under these circumstances were immensely relieved, not only from the after-effects of the chloroform inhalation, but also from the pain and depression of the vital forces, usually following a surgical operation.

Atropia is a remedy of the greatest value in the treatment of *angina pectoris*, and the "restraint neuroses" of the heart. Many of these cases are free from any organic lesion of the heart discoverable by our present means of investigation, being dependent apparently upon an irritation seated in the semilunar ganglion, the solar plexus, or in the terminal filaments of the pneumogastric, and in a few instances probably due to lesion of a remote part of the sensory nervous system. The best method of administering atropia in these affections during the access of pain and uneasiness, is by hypodermic injection—the best method, both in respect to promptness and efficiency. When pain is a prominent feature, morphia may be combined with atropia advantageously. Treatment in the interval between the seizures is scarcely less important. As stated by Wilson Fox,[1] Handfield Jones,[2] Romberg,[3] Laennec,[4] and others, more or less serious functional disorder of the heart is

[1] System of Medicine, Reynolds, vol. ii. p. 823 et seq.
[2] Functional Nervous Disorders, Am. ed. p. 215.
[3] Nervous Diseases of Man, Sydenham Society Translation.
[4] Quoted by Romberg.

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a very frequent symptom of stomach disease. Indeed, Handfield Jones expresses the belief that most cases of angina pectoris are of gastric origin. The cases produced in this way exist in varying degrees of severity, from simple irregularity in the heart's action to the severest spasm in which death seems imminent. Atropia, according to my observation, is the best remedy for these cardiac troubles. The alkaloid may be administered in combination with a mineral acid.[1] Trousseau[2] expresses great confidence in the internal administration of belladonna; but his opinion as to the hypodermic use of atropia is still more favorable. "The subcutaneous injection of atropia," says Trousseau, "inserted near the point of origin of the pains, and in the cervical and axillary regions, retards the return of the attacks, diminishes their violence, and finally cures them, if the neuralgia be not dependent upon an organic affection of the heart or great vessels." My own experience in these cases is entirely in accordance with this statement.

Atropia in the Respiratory Neuroses.—Belladonna has, for a long period, been employed in these affections. The greater activity and certainty of atropia, as well as its therapeutical power, render it more useful than the crude drug, or any of its pharmaceutical preparations. The hypodermic use of atropia alone, or combined with morphia in the treatment of the respiratory neuroses, especially asthma, is a very important addition to former methods. According to Erlenmeyer,[3] Oppolzer was the first to use atropia by subcutaneous injection for the relief of asthma. Prof. Courty,[4] in 1859, in the case of a lady aged 54, injected a solution of atropia over the pneumogastric nerve to arrest an asthmatic paroxysm. This practice does not appear to have been generally adopted—for our systematic works are silent on the subject. In the last American edition of Salter on Asthma no allusion is made to the hypodermic treatment of this disease. Having had considerable experience in the treatment of asthma by this method, I can speak with great confidence of its utility. A paroxysm of asthma may be quickly

[1] ℞.—Atropiæ, gr. j;
Acid. phosphor. dil. f℥ss;
Aquæ, f℥vijss.—M.
S.—A teaspoonful twice daily in water.

[2] Clinique Médicale de l'Hôtel-Dieu de Paris, tome ii. p. 134 et seq.

[3] Die subcutanen Injectionen der Arzneimittel, op. cit. p. 66.

[4] Lancet, 129—1—1860.

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ended by the subcutaneous injection of morphia and atropia.[1] In a few seconds after the injection, intestinal movements are excited, more or less loud gurgling occurs, abundant eructations of gas take place, and the patient experiences relief from the difficult breathing. A remarkable change is observed in the pulse; from being rapid and feeble, it becomes slower and fuller. The respirations are no longer laborious, and the diaphragm ceases its tumultuous movements. In from fifteen to thirty minutes after the administration of the injection, the patient is sufficiently relieved to lie down and sleep. But this treatment would be the less desirable, if it accomplished no more than the relief of the paroxysm. My own observation entitles me to say that it decidedly lengthens the interval between the seizures, and diminishes the violence of succeeding paroxysms. I am not prepared to say that spasmodic asthma may be cured in this way, no case having been under my observation a sufficient length of time, but the amelioration is so decided and so lasting as to justify confident expectations of procuring ultimate exemption.

In treating spasmodic asthma by the hypodermic method, it is better to anticipate the paroxysm. When the patient experiences the usual premonitions of an attack, a small injection will prevent its development.

The paroxysms of difficult breathing which accompany emphysema and mitral disease may also be promptly relieved by the subcutaneous injection of atropia and morphia, but in these cases the relief is more temporary. I have already indicated the reasons for caution in administering these injections in cases of mitral disease, and obstruction of the aortic orifice. They are not contra-indicated in cases of weakened walls and dilated cavities of the heart; although morphia alone is highly objectionable in these states.

Belladonna has long been employed in the treatment of hooping-cough. It is the best remedy for this disease, according to Trousseau,[2] and is strongly recommended by Brown-Séquard, who thinks to maintain the full physiological effects of this drug for a few days, is to bring about a cure. The alkaloid atropia is preferable to the crude drug, for the reason that it is more certain in its effects, and that a full physiological influence is more easily maintained by it.

[1] Atropia, $\frac{1}{24}$ to $\frac{1}{24}$ of a grain, morphia, $\frac{1}{8}$ to $\frac{1}{4}$ of a grain.

[2] Clinique Médicale, tome ii. p. 428.

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A solution of the sulphate[1] may be used twice a day, or a combined solution of atropia and morphia. Or, this disease may be quickly cured by the hypodermic injection, as practised for asthma, the influence being maintained for several days. In children, however, a simple solution, used internally, is better, for the reason that it will be taken readily, and its effect may be easily graduated to the physiological capabilities of the patient. In treating hooping-cough it should not be forgotten that children are not very susceptible to the action of atropia, and hence the dose should be increased until decided effects are produced. It is necessary further to remember that the effects of atropia are so lasting that two doses daily are quite sufficient to maintain a full effect.

Spasmodic cough, *laryngismus stridulus*, and aphonia, dependent upon irritation reflected through recurrent laryngeal nerves, are much benefited by atropia, as I have found by personal observation.

Atropia in Diseases of the Respiratory Organs involving Structural Alterations.—The various forms of cough accompanied by free expectoration are much benefited by atropia. A dry state of the bronchial mucous membrane and irritative cough dependent thereon, are unsuitable for the action of atropia. I have observed remarkably beneficial results from the combined use of morphia and atropia[2] in cases of phthisis, accompanied by violent cough, profuse expectoration, and hectic. The cough and expectoration, the hectic and the exhausting sweats especially, are much relieved by it.

Trousseau[3] has used injections of atropia for the relief of pleuritic pain. Cases of pleurisy may be conducted to an early conclusion by subcutaneous injection of morphia and atropia in the doses recommended for asthma, but this treatment is not adapted to those cases in which effusion has occurred. The injection administered when the symptoms first make their appearance will often prevent any further development of the disease.

[1] ℞.—Atropiæ sulphat. gr. j;
Aquæ destil. ʒj.—M.
S.—2 increased to 5 drops at a dose.

℞.—Atropiæ, gr. j;
Acid. muriat. dil. ʒss;
Aquæ, ʒvijss.—M.
S.—2 increased to 5 drops at a dose.

[2] ℞.—Morphiæ sulph. gr. xvj;
Atropiæ sulph. gr. j;
Acid. acetic. dil. ʒj;
Aquæ, ʒvij.—M.
S.—15 drops at a dose.

[3] Lancet, 129-1-1860.

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Neuroses of the Digestive Organs.—I have used atropia with success in the treatment of gastralgia, and enteralgia. Cases of dyspepsia, in which pain is a prominent feature, are often much benefited by a combination of atropia and a mineral acid. Painful conditions of the semilunar ganglion and solar plexus, causing symptoms of angina pectoris are cured by atropia. In one very alarming case of this character, occurring in a physician, I used with complete success a combination of atropia and morphia administered hypodermically. In the obstinate constipation caused by lead, and in some cases of intussusception, this method of treatment has been indicated, but I am unable to speak from personal observation of its real utility.

Dr. Fuller,[1] observed sickness and diarrhœa in five of twelve children to whom he administered belladonna. Trousseau considers belladonna a most important remedy against constipation. Its *modus operandi* is quite plain: it increases the peristaltic movements by inducing contraction of the unstriped muscular fibre of the intestinal canal. For this, as indeed for almost all the purposes to which belladonna is applied, atropia may be substituted with advantage. In constipation dependent upon atony of the muscular layer of the bowel it is indicated, but it is not a purgative in the technical sense of that term. It may be combined with other purgatives to meet particular indications.[2] Atropia is especially valuable in the constipation of females suffering from uterine disorder of a painful character. Feeble digestion, constipation, languid circulation in the skin, scanty and painful menstruations—conditions frequently associated, are much benefited by the conjoined use of atropia and iron, or atropia and a mineral acid.

There is no remedy, in my experience, comparable to atropia in the treatment of the vomiting of pregnancy. The best method of employing it for this purpose—at least in respect to therapeutical efficiency—is in the form of suppository.[3] In an analogous state

[1] Medico-Chirurgical Transactions, vol. xlii. p. 289.

[2] ℞.—Atropiæ sulph. gr. j;
Res. podophylli, ʒj;
Ext. colocynth. comp. ʒij.
Ft. pil. no. lx.
S.—One at night.

℞.—Atropiæ sulph. gr. ½;
Magnesiæ sulph. ℥j;
Syr. limonis, f℥iij;
Aquæ, f℥v.—M.
S.—A tablespoonful before breakfast.

[3] ℞.—Atropiæ sulph. gr. ½;
Belladonnæ extract. gr. viij;
vel Ol. theobrom. q. s.
Ft. supposit. no. viij.

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—sea sickness—atropia has been found very beneficial applied in solution to the epigastric region.[1] Dr. Le Coniat, Surgeon in the French Navy, is the author of this practice, but he does not rely upon the atropine solution alone; he conjoins with it localized electrization. It is difficult to say how far the result is due to atropia and how far to galvanism. Dr. Le Coniat affirms that the vomiting of pregnancy is equally amenable to this treatment. As my own observations show that atropia is very effective against the vomiting of pregnancy, it may be presumed that this agent is really the efficient means in the method of Dr. Le Coniat. As the local application of atropia in solution in water is capable of producing decided therapeutical results, it may be desirable to take advantage of the discovery of Dr. Waller, "who found that certain substances, such as atropia, strychnia, morphia, and the tincture of aconite when mixed with chloroform and applied on the skin, are absorbed very rapidly."[2] A solution of atropia in chloroform[3] may be applied over the epigastrium in cases of vomiting of pregnancy, or of sea sickness. I have employed the same solution externally in asthma with considerable advantage.

Atropia in Neuroses of the Pelvic Viscera.—It has been said that for pelvic pain, atropia is the best remedy. I have used it in cases of ovarian and uterine pain, in hyperæsthesia of the spermatic plexus, and in irritable bladder not dependent upon structural alteration, and the result has, in most cases, been very satisfactory. For the pain of dysmenorrhœa, the subcutaneous injection of atropia and morphia is preferable to the internal use of atropia alone.

Belladonna has long been used against that troublesome disorder—nocturnal incontinence of urine. Fuller,[4] Trousseau,[5] and various other observers report cures. Trousseau considers it the most valuable remedy which we possess against this disease (*l'arme thérapeutique la plus puissante*). In order to be successful, its full physiological influence should be steadily maintained for a considerable period. Atropia being more certain in its effects, is to be preferred to belladonna in the treatment of incontinence of

[1] New York Medical Journal, January, 1869, p. 390.

[2] Brown-Séquard, Lectures on Functional Nervous Disorders, op. cit.

[3] ℞.—Atropia, gr. ij–iv;
Chloroform. f℥j.—M.
S.—For local use.

[4] Medico-Chirurgical Transactions, vol. xlii.

[5] Clinique Médicale, tome ii. p. 659.

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urine. In order to cure, it is necessary in many cases to pay attention to the state of the urinary secretion, for we find that the urine has a strong acid reaction and is loaded with uric acid. The incontinence is due in such cases to a too stimulant quality of the urine, which excites the reflex contraction of the bladder. In other cases, a mere distension of this viscus with urine having a low specific gravity causes involuntary contractions, and this condition exists during the day. This is the form of incontinence especially under the control of atropia, for this agent acts by imparting tone to the muscular wall of the bladder, and to the sphincter muscle. Indeed, as I have shown elsewhere, atropia produces a tonic contraction of the sphincter, which cannot readily be overcome by the voluntary effort in micturition. I have succeeded in the cure of nocturnal incontinence of urine by atropia, when belladonna had previously failed. In a boy of ten who had been treated by extract of belladonna, I succeeded with one-fortieth of a grain of atropia twice a day. This patient exhibited a remarkable tolerance of the remedy. Fuller ascertained a similar tolerance in the cases of his choreic patients, which he interpreted to be peculiar to that disease, but which is only a peculiarity of early life. In another place, however, he admits that this medicine acts more powerfully on adults than on children.

In involuntary nocturnal seminal emissions, a condition analogous to the preceding, atropia is a more or less valuable addition to other methods of treatment. It cannot, however, be considered a remedy sufficient in itself to cure. To produce the best effects of which it is capable, atropia must be continued for a considerable period, the constitutional effects being steadily maintained. It has seemed to me to produce decided antaphrodisiac effects.

Atropia in Affections of the Nervous System of Animal Life.—As a remedy against pain, atropia is not comparable to morphia. Messrs. Mitchell, Morehouse, and Keen affirm that atropia does not relieve pain. On the other hand, Mr. Chas. Hunter[1] believes that it possesses very great anodyne power, and for many cases of neuralgia is preferable to morphia. It is more efficacious than morphia in the cure of pelvic pain and in sciatica. It relieves and sometimes cures *tic douloureux*. In the experiments on animals detailed in another part of this paper, atropia destroyed the excitability of the sensory nerves. We cannot, therefore, refuse to admit that it

[1] Hypodermic Injections. Pamphlet, Churchill, London, 1866.

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possesses pain-relieving power; but yet, my own experience has convinced me that it is much inferior to morphia. A combination of the two agents is more effective against pain than either used alone—a fortunate circumstance, since one counterbalances some of the ill effects of the other. This observation is true, at least in my experience, of the treatment of sciatica, for in a case recently under my charge, I found that the conjoined use of atropia and morphia was more effective than atropia alone.

In the treatment of pain by the use of atropia, whether administered internally or by subcutaneous injection, it is necessary to induce the full physiological effects in order to achieve the best therapeutical results. The hypodermic method is to be preferred, both in respect to certainty and permanence of effect.

In the various states of spasm, with or without pain, atropia is indicated. In convulsive *tic*, in wry neck, in the "late rigidity" which sometimes occurs in the course of hemiplegia, and in tetanus, it has been employed with more or less advantage. I have used it in these states, except tetanus, with success by hypodermic injection. Although the physiological effects of atropia indicate its employment in tetanus, the success of this practice has not been great. Physostigmia is much to be preferred in the treatment of this disease even from the point of view of its physiological effects, and clinical experience is largely in its favor.

In convulsions—epilepsy, chorea, epileptiform, hysterical, puerperal—great and immediate relief is afforded by the subcutaneous use of atropia and morphia. Belladonna is an old remedy for epilepsy. Trousseau[1] advocates its use strongly, but his recommendation of its utility is not supported by adequate statistical data, and the length of time for which it is to be used is a decided objection to its employment. For epilepsy occurring during the daytime, the convulsive seizures having the degree of severity known as the *grand mal*, no remedy probably is equal to the bromide of potassium; but for nocturnal epilepsy, for the *petit mal* and for irregular nervous manifestations, epileptoid in character, the hypodermic use of morphia and atropia, is preferable to all other means. The convulsions of children and puerperal convulsions are readily subdued by the same agents.

Dr. Fuller's experience with belladonna in the treatment of chorea, is not favorable to the use of this remedy. In a case of

[1] Clinique Médicale, op. cit.

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this disease which subsequently proved fatal, I used atropia by hypodermic injection without any influence over the jactitations.

Belladonna and its active principle have been more or less used in hyperæmia of the cord and in spinal meningitis, on the suggestion of Dr. Brown-Séquard, based on the influence possessed by this remedy over the vaso-motor nerves. Although sanctioned by the authority of so great a name, I venture to oppose to this practice my personal experience of its inutility and sometimes mischievous results. Moreover, as I have ascertained, the contraction of the capillary walls produced by atropia is followed by dilatation, and after death the most constant lesion discoverable is congestion of the meninges.

Atropia in Inflammation.—In inflammatory states of other tissue than the nervous, atropia has seemed to me very beneficial. We observe in the tunics of the inflamed eye how much control atropia has over the inflammatory action. This effect—a merely local action—has, undoubtedly, its counterpart in other tissues. An attack of pleuritis or peritonitis may be cured by atropia, but preferably by the conjoint administration of atropia and morphia. When inflammatory products form, the time has passed for the use of these agents, except in the condition of great depression of the heart's action and coldness of the surface-indications for the use of atropia. Acute catarrh with profuse secretion and pharyngitis, and mercurial salivation are sometimes remarkably improved by the internal use of this agent. The action of atropia in arresting secretion of the Schneiderian mucous membrane is explained by the experiment of Prevost,[1] who has shown that ablation of the spheno-palatine ganglion is followed by profuse secretion from this membrane.

Atropia is a remedy of great value in the treatment of rheumatic inflammation. Harley has called attention to the fact that injection of atropia in the neighborhood of an affected joint will relieve remarkably the pain and inflammation. Long before this statement was published, I had been in the habit of prescribing the internal use of atropia in rheumatic affections—acute, subacute, and chronic—with marked relief to the pain and apparently diminution in the duration of the disease.

Atropia in Poisoning by Opium.—I was skeptical as to the physiological antagonism of atropia and morphia, in respect to their toxic effects, until the experience related in another part of this

[1] Journ. de Physiologie normale et pathologique. 21. 2. pp. 207-232, 1868.

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paper had occurred to me. In that case every condition necessary for the solution of the problem was present. Complete insensibility, abolition of the reflex faculty, feebleness of the circulation and strong contraction of the pupil, had been produced by morphia, administered in a known quantity, and through a channel which permitted all of it to enter the blood. No other antidote was administered, and no other means of relief used, than the subcutaneous injection of atropia. Following the use of this agent, there occurred flushing of the face, warmth of the surface, return of the reflex faculty, dilatation of the pupil, more natural though profound sleep, finally restoration of consciousness, and disappearance of the narcosis. In most of the cases reported,[1] other agents and means were employed to arouse the patient. Even in Dr. S. Weir Mitchell's case (*New York Med. Journal*) electric shocks, agitation, etc., were made use of beside the belladonna, after evacuation of the contents of the stomach by the stomach pump. In a case of atropia poisoning reported by Dr. A. D. Williams,[2] of Cincinnati, morphia was alone used as the antidote, with a successful result. There can be no question, then, as to the antagonism between these two agents with respect to toxic effects. In applying this antagonism in practice, special attention should be paid to the relative duration of toxic activity, and to the proportionate quantities of one needed to overcome poisoning by the other. In my own case $\frac{1}{24}$ of a grain of atropia was equal in respect to physiological antagonism to one grain of morphia. The effects of this dose of atropia lasted twelve hours longer than the morphia. It is to be observed, however, with regard to the quantity of atropia and morphia respectively necessary, that individuals vary as to susceptibility. Thus, in the young, morphia is more, and atropia less active than in adults. Atropia is, also, more active in blondes than in brunettes. *Cæteris paribus*, $\frac{1}{24}$ of a grain of atropia may be considered equal to one grain of morphia. In treating narcosis produced by either agent, it is of great importance not to dilate or contract the pupil beyond the natural condition. Further, the deep somnolence produced by the two agents must not be confounded with the toxic effects of either, and the mistake be made of attempting to overcome this state of the brain by further administration of the physiological antagonist.

[1] Dr. W. F. Norris, Am. Journal of Med. Sciences, Oct. 1862. Dr. C. A. Lee, Ibid., New York Med. Journal, Nov. 1866.

[2] Lancet and Observer, Nov. 1868.

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Atropia as an Agent modifying or promoting the Action of Remedies.—I have already indicated the mutual reactions which ensue when atropia is administered conjointly with certain remedies, but some additional observations are necessary on this topic.

The combination of atropia and physostigmia would be seen to be proper in cases of tetanic spasm—tetanus, hydrophobia, etc.—in which physostigmia is now employed, but my experiments show that an entirely new class of actions is developed by their conjoined administration. Atropia is not a physiological antagonist to physostigmia, except in regard to their action on the organic nervous system. It would be improper, then, to use atropia against poisoning by Calabar bean; neither should they be combined in the treatment of tetanus.

Atropia modifies but does not prevent the toxic effects of strychnia. In the treatment of disease by strychnia in which it may be desirable to have the anodyne and calmative effects of atropia, the two may be combined. I have observed good effects from this combination in old cases of paralysis accompanied by rigidity and a painful state of the skin and muscles.[1] In cases of diminished sexual power with feeble erections and imperfect action of the ejaculatory apparatus, I have also used internally the sulphate of atropia and sulphate of strychnia,[2] with marked advantage. Such a combination, is also effective in convulsive *tic*, injected into the muscles the seat of the disordered action.

I have already written at sufficient length of the modifying influence which atropia exerts upon morphia.

As an agent modifying the action of purgatives, belladonna is much to be preferred to hyoscyamus. As atropia is much more certain in its effects, it should be used rather than the belladonna. It increases the activity and diminishes the pain and griping which so commonly attend the action of resinous cathartics. Moreover, by increasing the tonicity of the muscular layer of the bowels, it diminishes the tendency to inaction which results after the use of cathartic medicines.

As the flow of urine is increased by atropia, I have used it in cases of dropsy in conjunction with other remedies. Thus, it pro-

[1] Nitrate of strychnia $\frac{1}{45}$ of a grain, atropia $\frac{1}{75}$ of a grain, used by hypodermic injection.

[2] ℞.—Atropiæ sulph. gr. j;
Strychniæ sulph. gr. ij.
Ft. pil. 100. S.—One night and morning.

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motes the diuretic action of digitalis and lessens the danger of its depressing the action of the heart. It is obvious that atropia is contraindicated in cases of granular or waxy kidney. It is useful in those cases of dropsy, accompanied by asthma, in which the cardiac lesion consists of dilatation of the cavities and deficient contractile power of the walls of the heart.

CHAPTER II.

PREPARATIONS OF ATROPIA.

THE frequent references in the preceding pages to the hypodermic use of atropia, requires some further observations on the solutions to be employed. I have already indicated the quantity of atropia to be administered internally or by hypodermic injection in certain states of disease.

The requisites of a proper solution for subcutaneous injection are—

1. The solution must be neutral.
2. The solution must be perfect—*i. e.*, free from crystals, particles of dirt, etc.
3. The solution must not be too concentrated.

The sulphate of atropia is readily soluble in water. I prepare for my own use a solution containing two grains to the ounce of water, as in the following formula:—

℞.—Atropiæ sulph. gr. ij;
Aq. dest. f℥j.—M. Filter.

Five minims of this contain $\frac{1}{48}$ of a grain of atropia. If the solution be too concentrated, more irritation will result at the point of injection, than if the solution were sufficiently diluted. Moreover, if the quantity to be injected be very small, it is very difficult even with an accurate instrument to inject the exact amount intended. As no injury to the tissues is wrought by pure distilled water, there can be no objection to the use of dilute solutions.

For the relief of pain and spasm and to procure sleep, it is better to use a solution containing both morphia and atropia than either alone. I prepare a morphia solution as follows:—

℞.—Morphiæ sulph. gr. xvj;
Aquæ destil. f℥j.—M. Filter.

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Seven and a half minims contain $\frac{1}{4}$ of a grain of morphia. These solutions may be combined as follows:—

℞.—Sol. morphiæ sulph. ʒvj;
Sol. atropiæ sulph. ʒij.—M. Filter.

Ten minims of this contain $\frac{1}{6}$ of a grain of atropia and one-fourth of a grain of morphia. Ten minims of the mixed solutions is a suitable quantity for ordinary purposes. The relative proportions of the atropia and morphia may be varied according to the particular indications to be met.

When a solution of atropia is kept for a few days, and sometimes for a few hours, a minute organism is developed in it—a *penicillum*. Various agents without irritant properties have been used to prevent the development of this organism hitherto, in my experience, without satisfactory results. A solution of carbolic acid—one per centum—has been tried and recommended; alcohol, alum, and some others have been patiently tested by a medical friend, without, however, as yet hitting upon a substance which itself, without having irritant qualities, may prevent the growth of this organism. So unsatisfactory have these efforts proved, that I now content myself with frequent preparation of the solution. To prepare a large amount of the solution, and frequently filter it, in order to rid it of the parasitic plant, is not proper; for we find that such solution rapidly loses strength, the growth of the organism taking place, in part at least, at the expense of the atropia.

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OBSERVATIONS AND RESEARCHES

ON

ALBINISM IN THE NEGRO RACE.

BY

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OBSERVATIONS AND RESEARCHES ON ALBINISM (LEUCOPATHIA, LEUCÆTHIOPIA) IN THE NEGRO.

SECTION I.

DESCRIPTION OF ALBINISM IN THE NEGRO RACE.

My attention was directed to the following interesting case of albinism, by my friend and colleague Doctor Thomas R. Jennings, Prof. of Anatomy in the Medical Department of the University of Nashville.

Alfred Aikins, age eighteen months, second son of Lewis and Margaret Aikins, negro man and woman.

The skin over the entire surface of the little negro is perfectly white; rivalling in whiteness that of the fairest and most delicate white child of the same age.

Iris very pale, bordering on pink, with light bluish and purplish reflections.

Pupils bright pink.

Strong light is painful to the eyes of this little albino; and the eyes present a constant tremulous or dancing motion. In a strong light the features are contracted and contorted, and the impression is evidently painful, and the vision rendered indistinct.

Features "thoroughly negro":—flat nose, thick lips, and low forehead. Feet present the usual characteristics of the African race.

Hair of head crisp and curled, perfectly white, and similar in all respects, with the exception of the color, to the crisp, curling wool-like hair of the father and mother.

The limbs and muscles generally appear to be well developed; his spirits are excellent, and he appears to be disposed to domineer over his little negro companions, of the same color, biting, scratching, and striking them whenever they interfere with his childish plays. Whether the position which he assumes towards his black

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companions is due to the "superiority of color," or the necessary result of the great adoration and deference paid him by his mother and friends, we will not attempt to determine.

The photograph (Plate I.) from nature represents the little albino, in the arms of his fat, black mother, and conveys a fuller and more truthful idea of this "*lusus naturæ*" and his sable origin than the most elaborate description.

WILLIAM AIKINS (albino), brother of the child Alfred just described, and *first-born* of Lewis and Margaret Aikins. This albino resembled in all respects the boy Alfred, his brother.

Constitution rather feeble: died during the period of teething, at the age of fourteen months.

Two of the fingers of the right hand were united—a congenital deformity. The eyes were pink, and the hair perfectly white, resembling in all respects that of his brother.

The photograph (Plate II.) was taken of this child after death.

MARGARET AIKINS, mother of the albino, stout, hearty negro woman, with glossy skin and hair, cheerful countenance and kind disposition. Features more regular, and nose somewhat more prominent than usual with negroes. The photograph presents a good likeness of this woman, with her albino child in her arms. Age 26. Has a few perfectly white spots upon the arms, and says that similar spots exist upon her thighs. The contrast between the dark skin and the milk-white spots is very striking. The white spots are irregular in shape, and about three-tenths of an inch in diameter. Margaret enjoys good health, and has never been sick in her life. The mother appears to be very proud of her *white* child.

LEWIS AIKINS, father of the albinos, Albert and William, and husband of Margaret. Stout, active negro man, with black complexion like that of his wife, and with similar black, curling, wool-like hair. Age 30; has all the characteristics of the negro.

SARAH HILL, mother of Margaret Aikins, and grandmother of albino children, age 54. Complexion considerable lighter than that of her daughter, but features and hair that of the negro.

About fourteen years ago, the mistress of Sarah called her attention to white spots upon her arm, and fearing that it was the leprosy, sent for a physician.

Until her attention had been directed to the spots by her mistress, Sarah had never observed their existence. The physician who examined the spots declared that it was unnecessary to ad-

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MARGARET AIKINS AND HER ALBINO SON ALFRED.

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THE DUVAL STEAM LITHOGRAPHIC CO. PHILA.

WILLIAM AIKINS, ALBINO CHILD OF MARGARET & LOUIS AIKINS.

Plate II.

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minister medicine, and Sarah applied to an old negro doctor, who gave her *bitters* (decoction of some vegetable leaves and roots). Sarah affirms that the spots which had been increasing rapidly before the administration of the old negro doctor's medicine, ceased to increase in size and number, and many of them commenced to turn dark.

The anterior surface of her face, arms, and thighs presents a mottled appearance, with whitish and dark-brown spots upon the dark brownish-yellow skin. Twenty-four perfectly white spots of irregular shape and size, the largest being about four-tenths of an inch in diameter, were counted upon the anterior surface of the arm, between the elbow-joint and the wrist. There is a scar over the upper portion of the breast-bone, just at the junction of the neck with the trunk, resulting from a slight burn in childhood. A short distance below this scar there are three white spots about half an inch in diameter.

Sarah Hill has always enjoyed good health; there is no appearance of any disease of the skin; has had five children, three of whom died in infancy; she observed no spots upon them. We have already given the description of her daughter, the mother of the little albino. The other child of Sarah is a stout grown negro man, who, like his half-sister and mother, has several white spots upon his arms and thighs. He is married to a stout, hearty black woman, and has one child, of a light-brown color and without spots.

Sarah had four brothers, none of whom had spots, as far as her information extends; she had seven sisters, all of whom had white spots, and several of their children also have small white spots.

The first husband of Sarah, the grandfather of the little albino, and father of Margaret, was a stout, large negro, weighing about two hundred pounds, of a dark skin, like that of his daughter, who resembles him in size and appearance.

ABNER EVANS, father of Sarah, grandfather of Margaret, and great-grandfather of albino child. Described by his daughter as a small active man, with light complexion, like that of his daughter, with no admixture of white blood.

Abner had white spots on arms and legs, which increased with age. This man enjoyed good health, was the father of fourteen children, eleven of whom were borne to him by the mother of Sarah, and, as we have before said, the seven daughters had white spots like their father. His first wife (the mother of eleven chil-

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dren), was a stout, active, dark-colored negro woman; she had no spots, and died at the age of 60 from dropsy. Abner reached the good old age of 80 years.

ROBERT CREWS, albino negro man; age fifty-two; height about five feet eight and a half inches; weight one hundred and forty-two pounds. Born in Halifax Co., Virginia; moved to Tennessee when eight years of age; has been living in Nashville twenty-six years. Says that the hair of his head was perfectly white when young, and eyes pink; now the hair is of a light yellowish-brown, and his eyes of a clear brown color, with dark pupils. The hair is crisp, and wool-like, resembling in all respects the hair of the negro. Eyes restless and weak; strong light is painful, and the contraction of the muscles of the face, consequent upon the action of light, has given a permanent expression and cast to the features. When examining any object in a bright light, the eyes are nearly closed, and they are placed very near, and moved from side to side in a restless manner.

His first master employed him as a cook, but his eyes were so painfully affected by the fire that he had to give this occupation up.

Features those of a negro, with flat nose and low forehead; complexion florid, and capable of showing the blush of anger, and the effects of emotion upon the capillary circulation. Has always enjoyed good health, and for a number of years has driven a small wagon, and engaged in the moving of furniture.

Has been married for twenty-four years, but has never had children. His wife had a child by her first husband, at an early age, before his marriage, and he says that the physician who attended her in the confinement "stated that she would not have any more children." Sexual organs of this albino well developed, and no deficiency of sexual appetite. Mother and father both dark-colored negroes. Had three brothers and two sisters, who were all dark-colored, and some of them black.

This albino has more than the usual amount of intelligence amongst negroes, and has always led an active and industrious life. As a proof of his industrious and active habits, he purchased his freedom for $750, several years before the recent civil war.

Plates III. and IV. present accurate representations of this albino.

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ALBINO NEGRO MAN ROBERT CREWS.
(Full Face.)

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ALBINO NEGRO MAN ROBERT CREWS.

(Side Face.)

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SPOTTED NEGRESS, LEMISA BERT.

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SECTION II.

THE SKIN OF THE NEGRO, ORIGINALLY BLACK, MAY, AT A PERIOD SUBSEQUENT TO BIRTH, GRADUALLY CHANGE ITS COLOR FROM BLACK TO WHITE, UNTIL THE COMPLETE ALBINO CHARACTER IS INDUCED.

Two instances have come to my knowledge, one of which I examined myself, and the other I received upon reliable testimony, in which spots appeared in the skin of negroes, about the middle of life and progressively increased in number and size, as in the case of Abner Aikins.

In addition to these cases, I have recently (September, 1867) examined the following case:—

LEMISA BERT (Plate V.), spotted negress. True African features, woolly head, flat nose, thick lips, low forehead, black skin; age forty-five; born in Tennessee; at the present time follows the occupation of rag picker in and around Nashville, assisted by her youngest (mulatto) child. Mother and father native Africans. The father had sixteen children, and presented a condition similar to that of his daughter, with white lips and hands. One of Lemisa's sisters was spotted like herself, only more extensively, and some of the spots presented a yellow color.

Lemisa Bert has enjoyed pretty good health with the exception of "falling of the womb;" has had six children, three of whom, she says, died of scrofula; the youngest child (by a white man), is a smart mulatto girl, of eleven years. One of her children, a young woman of eighteen years, whose father was a negro, is spotted like her mother, only to a greater extent, and many of the spots presenting a yellow color.

Lemisa Bert has been turning white during the past nineteen years; the change commenced in small spots, which have progressively increased. Complains of some itching of the skin during warm weather; I could detect no disease of the skin, however, with the magnifying glass. The palms of the hands are white, and Lemisa has perfectly white spots on arms and neck; on the right arm near the axilla, a large spot, about four inches in the longest diameter, and three inches in the shortest diameter. Both to the naked eye and under the magnifying glass these spots present mainly the same appearance as the skin of the white, and the blue veins are distinctly seen as in the fairest skin.

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Several observers have recorded the gradual change of the skin of the negro from black to white.

In 1697, Will Byrd, Esq., F. R. S., gave the following "account of a negro boy dappled in several places of his body with white spots."

"This negro boy, of about eleven years of age, was born on the upper part of Rappahannock River, in Virginia; his father and mother were both perfect negroes, and the boy himself till he came to be three years old, was in all respects like other black children; and then, without any distemper, he began to have several little white specks on his neck and breast, which increased with his age, both in number and size; so that now from the upper part of the neck, where some of his wool is become white, down to his knees, he is everywhere dappled with white spots, some of which are broader than the palm of a man's hand. They are very white and do not show flesh and blood so lively through them as the skin of white people; the reason of which may be that the skin of a negro is much thicker. His face, arms, and legs are perfectly black."[1]

Mr. James Bate, Surgeon in Maryland, published in the *Philosophical Transactions* of 1759, the following observations "On the Remarkable Alteration of Color in a Negro Woman."

"Frank, a cook-maid in Col. Barnes's family, a native of Virginia, about 40 years of age, remarkably healthy, of a strong and robust constitution, had her skin originally as dark as that of the most swarthy African; but about fifteen years before, that membrane in the parts next adjoining to the finger nails became white. Her mouth soon underwent the same change, and the phenomenon had since continued gradually to extend itself on the whole body; so that every part of its surface became more or less the subject of this surprising alteration.

"At the above date, four parts in five of the skin were white, smooth, and transparent, as in a fair European, elegantly showing the ramifications of the subjacent bloodvessels; the parts remaining sooty, daily lost their blackness, and in some measure partook of the prevailing color; so that a very few years would, in all probability, induce a total change. The neck and back, along the course of the vertebræ, maintained their pristine hue the most, and in some spots proclaimed their original state; the head, face, and breast, with belly, legs, arms, and thighs, were almost wholly white; the pudenda

[1] Philosophical Transactions, 1697, vol. xix. p. 781, No. 235.

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and axillæ partly colored; the skin of these parts, as far as white, being covered with white hair; when dark, with black. Her face and breast, as often as the passions anger, shame, etc., had been excited in her, had been immediately observed to glow with flushes; as also when, in pursuance of her business, she had been exposed to the action of the fire on these parts; some freckles had made their appearance.

"This woman declared that, excepting about seventeen years before, when she was delivered of a child, she had never been afflicted by any complaint of twenty-four hours' continuance, and that she never remembered the catamenia to have been either irregular or obstructed, only during this pregnancy; she had never been subject to any cutaneous disorders, nor made use of any external applications by which this phenomenon might be produced. The effects of the bile on the skin are well known to physicians, and had given rise to an opinion, that its color was determined by it; but this did not appear to have anything to do here, since from all the circumstances it was impossible to find the least reason to suspect that this fluid, whether cystic or hepatic, had undergone any alteration.

"As ustion is known to make the skin of negroes become white, and as she was daily employed in the business of cooking, it might perhaps be supposed the effect of heat; but this could never be the case, as she had ever been well clad; and the change was as obvious in the parts protected from the action of that element as in those most exposed to it. As an emunctory, the skin seemed to perform its office as well as possible, the sweat with the greatest freedom indifferently pervading the black and white parts."[1]

The Rev. Samuel Stanhope Smith, D. D., LL. D., in his "Essay on the Causes of the Variety of Complexion and Figure in the Human Species," originally pronounced as an oration before the American Philosophical Society in 1787, relates the following interesting case:—

"Henry Moss, a negro in the State of Maryland, began upwards of twenty years ago, to undergo a change in the color of the skin, from a deep black to a clear and healthy white. The change commenced about the abdomen, and gradually extended over different parts of the body till, at the end of seven years, the period at which I saw him, the white had already overspread the greater

[1] The Philosophical Transactions of the Royal Society of London, vol. li. p. 175; also Abridgment of same by Charles Hallon, Shaw and Pearson, vol. xi. p. 370.

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portion of his skin. It had nothing of the appearance of a sickly or albino hue, as if it had been the effect of disease. He was a vigorous and active man, and had never suffered any disease either at the commencement or during the progress of the change. The white complexion did not advance by regularly spreading from a single centre over the whole surface. But soon after it made its appearance on the abdomen, it began to show itself on various parts of the body, nearly at the same time, whence it gradually encroached in different directions on the original color, till at length the black was left only here and there in spots of various sizes and shapes. These spots were largest and most frequent where the body, from the nakedness of the parts or the ruggedness of his clothing, was most exposed to the rays of the sun.

"This extraordinary change did not proceed by gradually and equably diluting the intensity of the shades of the black color over the whole person at once; but the original black, reduced to spots, when I saw it, by the encroachments of the white, resembled dark clouds insensibly melting at their edges.

"The back of his hands, and his face, retained a larger proportion of the black than other parts of his body; of these, however, the greater portion was changed. And the white color had extended itself to a considerable distance under the hair. Wherever this took place, the woolly substance entirely disappeared, and a fine, straight hair, of silky softness, succeeded in its room." Dr. Smith adds, in a foot-note, that "the extraordinary nature of this phenomenon strongly attracted the attention and benevolence of the public; and the man obtained, from the liberality of those who visited him, a sum sufficient to purchase his freedom, with a surplus to be applied afterwards to his own use. I examined him in company with the Rev. Dr. Rodgers, and John R. B. Rodgers, M. D. of New York, gentlemen, than whom none are more capable of observing and examining a fact of this nature, with a sound and accurate judgment.

"Shortly after this period, Henry Moss removed into the State of Virginia, since which time I have not had an opportunity of seeing him; but I have been informed by respectable authority that the whitening process was soon afterwards completed; he could not be distinguished from a native Anglo-American."[1]

Dr. Smith inferred from this case: "In the first place, that secre-

[1] Pp. 92-94.

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tion in the skin which contributes chiefly to the formation of the negro complexion, seems to be the chief cause also of the curl or woolly appearance of the hair; for wherever the white color in this man extended beneath the hair, there the form of that excrescence was entirely changed. In the next place, although there was evidently a strong and general tendency in the constitution of this negro to a change of color, yet this tendency was much longer resisted in those parts of the body which were most exposed to the immediate action of the sun's rays, than in others. As he was a laboring man, wherever there were rents in the thin clothes which covered him, there were generally seen the largest spots of black; whence I infer that when any dark color has been contracted by the human skin, the solar influence alone, and the free contact of external air, will be sufficient to continue it a long time, even in those climates which are most favorable to the fair complexion. It is found by experience that different shades of the dark complexion are easily impressed by different causes on a skin originally fair, and when once impressed, the slightest influence of the same causes is sufficient to continue it."[1]

The partial albino (or examples of individuals spotted with different colors, where the whiteness of the skin exists in certain parts of the surface only, while the remainder of the body is of the ordinary color), was not unknown to the ancients, and other well authenticated cases, where the skin of the negro has gradually changed its color from black to white, have been recorded by Gaultier, Le Cart, Rayer, and Rush.

Blumenbach has described a negro of this kind whom he saw in London, a servant to the person who kept the animals at Exeter Change. He was a young man, perfectly black, excepting the umbilical and hypogastric regions of the abdomen and the middle of the lower limbs, including the knees and neighboring parts of the thighs and legs, which were of a clear and almost snowy whiteness, but spotted with black like the skin of a panther. His hair was of two colors. On the middle of the front of the head, from the vertex to the forehead, where it ended in a sharp point, there was a white spot with a yellower tinge than those on the trunk and legs. The hair covering this was white, but resembled the rest in other respects. On comparing the picture of this man with three others (a boy and two girls), Blumenbach observes that the white spots

[1] Pp. 94–95.

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occupied the abdomen and thighs, never appearing on the hands and feet, which parts, with the groins, are the first to turn black in the newly-born negroes; and that the arrangement of the white parts was symmetrical. Both the parents of this man and of the others of whom Blumenbach had collected accounts were entirely black. Blumenbach also records two instances in Germans; one of a youth, the other of a man sixty years old, both of whom had a rather tawny skin, marked here and there with various sized spots of the clearest white. These spots appeared first in the former in infancy, and in the latter at the age of manhood.

Jefferson mentions a negro, born black, of black parents, in whose chin, when a boy, a white spot appeared, and continued to increase till he became a man, when it extended over the chin, lips, one cheek, the under jaw and neck of the same side.[1]

Caldani states that a negro, who was a shoemaker at Venice, was black when brought during infancy to that city, but became gradually lighter, and had the hue of a person laboring under slight jaundice; and Klinkosch mentions the case of a negro who lost his blackness and became yellow.

An English lady, who had formerly resided in Virginia, informed Dr. Parsons that Admiral Franklin took a Spanish ship in wartime and brought her into Carolina, and in searching found a picture of a boy who was as beautifully mottled all over with black and white spots as any dog that ever was seen; it was uncertain which was the ground, or which color the spots were of. Several copies of the picture were taken in Carolina, and they said it was a portrait of a child born of negro parents on the Spanish main; the ship was bound to old Spain.[2]

SECTION III.

ALBINOS OCCUR AMONGST ALL THE RACES OF MEN, AS WELL AS AMONGST MANY OF THE SPECIES OF DOMESTIC AND WILD ANIMALS.

The occurrence of albinism amongst the negroes of the southern United States is by no means rare. I have myself met with several other instances, and in one case an albino woman in my native county (Liberty County, Georgia), whom I have seen upon numer-

[1] Lectures on Comparative Anatomy, Physiology, Zoology, and the Natural History of Man, by William Lawrence, F. R. S., pp. 207–8.

[2] Philosophical Trans. Roy. Soc. of London, vol. lv. p. 45, 1765.

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ous occasions, bore children to a black man, and the children had reddish woolly hair and yellow complexions, and I am inclined to attribute the yellow color in the great-grandfather and grandmother of the albino child described in this paper, to the same causes which produced the white complexion, and not to any admixture of the blood of any white race. In the grandmother, the color of the entire body is mottled, and not uniform; this is especially seen in the skin of the face. These facts support the opinion that there is a tendency to the development and propagation of this peculiarity in certain families. During my collegiate course I had two college mates, who were true albinos and brothers; and I was informed that several other members of this family manifested the same peculiarity.

Some of the earliest writers did not hesitate to affirm that albinos were confined to the offspring of negroes. But it appears, from the testimony of various observers, that they were not only known from the earliest times, but that they occur amongst all nations; and that there is no race of men, nor any part of the globe, in which this freak of nature may not be manifested. It has even been asserted that whole tribes of albinos have been seen in Africa, Java, Ceylon, and the Isthmus of Darien. As this variation of the skin first attracted attention in the African, from the great difference of color, the individuals were termed leucæthiopes, or white negroes. From their avoiding the light, the Dutch are said to have given them in the island of Java, the contemptuous appellation of kakkerlakken, cockroaches, insects that run about in the dark; whilst the Spaniards call them albinos, and the French blafards.

Pliny, in the second chapter of the Seventh Book of his Natural History, quotes Isigonus of Nicæa, who relates that in Albania there is a certain race of men, whose eyes are of a sea-green color, and who have white hair from their earliest childhood, and see better in the night than in the day. Cuvier, in his observations upon this passage of Pliny's Natural History, supposes that the variety of the human species to which the term Albino has been applied, from the whiteness of their hair and skin, is more frequently found in the close valleys of the mountainous districts, and may therefore have been often met with in Albania, which is composed of valleys in the Caucasian range.

In the eighth chapter of the Fifth Book, Pliny calls a certain people of Africa Leucæthiopians, or white Ethiopians; the same

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term was used by Pomponius Mela and Ptolemy; but as these writers give no description of the people thus designated, some have supposed that the Leucæthiopes were a tribe of negroes whose complexion was less dark than that of Africans generally.

Cortez, in his narrative of the conquest of Mexico, in describing the palace of Montezuma, amongst other objects of rarity or curiosity which were found in it, mentions male and female albinos.

"In hujus palatii particula tenebat homines, pueros, fœminasque a nativitate candidos in facie, corpore capilis, superciliis, et palpebris."

Wafer, who accompanied Dampier in one of his voyages, relates that albinos are not unfrequently found amongst the inhabitants of the Isthmus of Darien. Wafer described their skin as milk-white, much like the color of a white horse, and covered with a short and whitish down, and the hair upon their head and upon their eyebrows of a milky white, and the former, which is exceedingly beautiful, is rather frizzled, and in length from seven to eight inches. "They see not very well in the sun, poring in the clearest day, their eyes being but weak, and running with water if the sun shines towards them, so that in the daytime they care not to go abroad, unless it be a cloudy dark day. But notwithstanding their being thus sluggish and dull in the daytime, yet when moonshiny nights come they are all life and activity, running abroad and into the woods, skipping about like wild bucks; and running as fast by moonlight, even in the gloom and shade of the woods, as the other Indians by day, being as nimble as they, though not so strong and lusty."

Various travellers, as Ribeyro, Percival, Cordiner, and others, and various naturalists, have met with albinos in some of the oriental isles, and more especially in Java and Ceylon, exhibiting the white skin and hair and pink eyes, while in other respects they conformed to the external characters of the native race.

According to Dubois, albinos are not uncommon amongst the Hindoos.

Cook, in his first voyage, saw six albinos in Otaheite; in his second voyage he saw one in New Caledonia, and in his third voyage he met with three in the Friendly Isles.

Blumenbach saw sixteen albinos in various parts of Germany, and they have been noticed in England, Ireland, Denmark, France, Switzerland, Italy, Hungary, Austria, the Grecian Archipelago, and in North and South America.

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We are informed by Marsden that in Java the gallinaceous fowls are often affected with albinism, and many travellers assure us that this peculiarity often appears in the human species in the Sunda Isles.

Charles Pickering, in his *Races of Man*, mentions an albino amongst the Malay race inhabiting the Ellice or Vaiterpan group of Islands; albinos were also spoken of by the inhabitants as occurring in Tahiti. Dr. Pickering at Reeva observed a male albino of the Papuan race, whose complexion was even fairer than that of Europeans when equally exposed to the sun, but was not free from brownish specks; the iris was blue without any perceptible tinge of red; and he had his brows always knit, as if affected by the light. The hair was not white but flaxen. Several albinos were enumerated by residents, and Dr. Pickering was inclined to think that they occur more frequently in the Papuan than in any other race.

Dr. Azara, in his *History of the Quadrupeds of Paraguay*, has given numerous examples of albinos among the animals, as well as among the Indians and negroes in South America.

It is thought, however, that albinism occurs most frequently amongst the negroes in Africa.

Thus Dr. Winterbottom observed eleven instances among the native tribes about Sierra Leone. De la Croix informs us that albinos compose a considerable body of attendants at the court of the King of Loango, and Ludolf has made a similar statement; and Bowditch observes that the King of Ashantee had, at his court, "nearly one hundred negroes of different colors, through the shades of red and copper to white." Dr. Winterbottom mentions an albino negro, born in Nova Scotia, and Mr. Jefferson, in his *Notes on Virginia*, gives seven examples of this peculiarity in the negro slaves of Virginia.[1]

[1] Dr. James Parsons exhibited to the Royal Society a "white negro" (albino), and detailed the following history of the case:—

It appeared that the parents of this boy were brought, among many others, above 300 miles, from an inland country, to the gold coast in Africa, and put on board a ship bound to Virginia, where they arrived in the year 1755. They became the property of Colonel Benjamin Chambers, of Cumberland County, in Pennsylvania, and were then employed on an estate of the Colonel's in Virginia; but the Colonel lived with his family in Pennsylvania, when he sold his boy to his then master—of which fact Dr. P. saw the bill of sale that passed between the Colonel and him.

The parents were perfectly black, and both very young when landed; and the

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Dr. Pickering observed two albino children amongst the negroes of Africa, in whom the negro aspect had so entirely disappeared that they might have passed for the children of Europeans, but for the remarkable appearance of the hair, which could only be compared to a white fleece.

Dr. Charles Bachman, of South Carolina, in his valuable work on *The Doctrine of the Unity of the Human Race examined on the*

woman being asked how far she was gone with child, answered, so as to be understood to mean, that she was with child something more than six moons, and that this was her first pregnancy. They also declared that they had never seen a white person before they came to the shore where the Europeans were employed buying black slaves.

The owner of this boy was Mr. James Hill Clark, whom Dr. Parsons informed of what had passed between Dr. Franklin and himself on this subject; for he paid him a visit, and in the course of conversation he informed him that, while he was in England before, he received a letter from his lady, in which was some of the wool of a white negro child's head, by way of curiosity; and when he mentioned it to Mr. Clark, he assured him that this same boy was shown in Pennsylvania as a great rarity, and that, to his own knowledge, the wool sent in this letter was taken from this child's head. He was born about six or seven weeks after his parents landed in Virginia, in the year 1755, and was purchased by Mr. Hill Clark of Col. Chambers in 1764, so that he appeared not to be quite ten years old; and his mother had had two children after, who were both as black as the parents.

Dr. Parsons states that instances of the same kind had happened before. There was one, about four years before, in London, which was a white girl, something younger than this boy, but exactly similar in color, wool, etc., and was said by the person who made a show of her, to have been the offspring of a black father and mother. The lady of a respectable family who came to live in Red Lion Square, after having lived in Virginia for several years, related the following case to Dr. Parsons:—

About nineteen years previous, on a small plantation in Virginia, two slaves, both black, were married, and the woman brought forth a white girl. When the poor woman was told that the child was like the white children of white people, she was in great dread of her husband, declaring, at the same time, that she never had anything to do with a white man in her life, and therefore begged they would keep the place dark that he might not see it.

When he came to ask her how she did, he wanted to see the child, and wondered why the room was shut up, which was not usual. The woman's fears increased when he had brought it into the light; but while he looked at it he seemed highly pleased, returned the child, and behaved with extraordinary tenderness. She imagined that he dissembled his resentment till she should be able to go about, and that then he would leave her. But in a few days he said to her, "you are afraid of me, and therefore keep the room dark because my child is white; but I love it the better for that—for my own father was a white man, though my grandfather and grandmother were as black as you and myself; and, although we came from a place where no white people ever were seen, yet there was always a white child in every family that was related to us."—*Philosophical Transactions of the Royal Society of London*, 1765, vol. lv. p. 45.

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Principles of Science, affirms that he has seen a number of examples of albinism amongst the blacks of South Carolina; and says that he has been informed that, in St. Domingo, Guadeloupe, and Martinico, the negroes of African origin produce one, out of six or seven children, of this albino variety. He does not, however, vouch for the entire truth of this assertion.

As far as my own observations extend, I have been led to the belief that this freak of nature occurs as often amongst the white races as amongst the African; the apparent disparity is perhaps due, in great measure, to the more striking and wonderful contrast in the negro.

Amongst wild animals, I have observed albinos in turtle doves (Ectopistes Carolinensis), ground dove (Columba passerina), crow (Corvus Americanus), hooting owl (Syrnium nebulosum), leather-wing bat (Vespertilio Carolinensis), fox squirrel (Sciurus capes-tratus), gray squirrel (Sciurus Carolinensis), and common rabbit (Lepus sylvaticus).

And amongst domestic birds and animals I have observed this peculiarity in the English and Muscovy ducks, common chicken, pigeon, rabbit, horse, hog, cow, cat and dog, and mice.

After extended investigation and examination of thousands of living specimens, I have never observed an albino amongst cold-blooded animals.

When this class of animals have been confined in dark caves, and excluded from the action of the light, they present the appearance of the albino; and it is probable that, if the negro children which are almost white at the time of their birth were reared in total darkness, they would in like manner be white.

I have seen living sirens from the caves of Africa, without a particle of coloring matter in their skins, and so transparent that the form and pulsations of the heart, and the circulation of the blood, could be discerned through the walls of the abdomen and chest, and Dr. Blackie has informed me that he has seen similar colorless salamanders in the dark caves of Northern Georgia.

I have in my possession specimens of the blind fish (*Amblyopsis spelvens*), the blind cray-fish (*Astacus pellucidus*), and of the crickets, with eyes of the dark caverns of the caves of Kentucky; which are entirely wanting in coloring resembling albinos. The absence of the ball from the socket of the eye in the blind fish, and the absence of the eye from the peduncles of the blind cray-fish, may be most philosophically attributed to the absence of that

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agent upon which the production of color depends. And it is now well established that we may arrest and alter the development of the tadpole, and other animals, by raising the amount of the physical forces heat and light.

The white color of animals (or rather the colorless and transparent nature) which have been excluded from the light, is a different phenomenon from that of albinism, although the thorough discussion of the effects of physical agents in arresting or accelerating the development of the blood, color, organs, and structures of animals is destined to throw much light upon the phenomena of albinism.

SECTION IV.

THE ALBINO IS NOT NECESSARILY FEEBLE OR STERILE; BUT IS CAPABLE OF PROCREATION, AND WHEN TWO ALBINOS ARE UNITED, THERE IS A TENDENCY TO THE ESTABLISHMENT OF A PERMANENT VARIETY.

Some writers have expressed the opinion that the albino possesses a general delicacy of habit and constitution, and even exhibits a deficiency of mental power; and is incapable of propagation. Blumenbach conceived that albinos labor under a disease, which he referred to the cachexiæ, and considers as akin to leprosy; and Dr. Winterbottom describes them, not under the head of the native Africans, but classes the affection under the head of diseases.

G. St. Hilaire supposes that there are two species of albinism, one the effect of disease, the other a true anomaly.

Mansfeldt ascribed the production of the albino state to some shock given to the fœtus by an impression made upon the mother; and G. St. Hilaire essentially adopts this hypothesis, ascribing the peculiar state of the skin to an arrest of development, in consequence of which the coloring matter is not formed at the requisite period.

Herodotus maintained that the difference of color in different races was manifest in like manner in the seminal fluid: thus, in his third book (Thalia 101), he describes the Indians, who have a complexion closely resembling that of the Ethiopians, as having intercourse openly like cattle, and emitting seed, not white as that of other men, but black as their skin. Herodotus also affirms that the Ethiopians emit similar seed. This idea, which was controverted by Aristotle, has been revived by Maupertuis, and the color of the negro has been referred by Le Cart to a peculiar substance which he names "Ethiope Animal," which he supposes is contained in

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their fluids, and the absence of this substance converts the negro into an albino.

The celebrated Count de Buffon considered albinism as a kind of malady, and albinos as "individuals who had degenerated from their race by some accidental cause." Buffon says: "This last opinion appears to me, I own, the most probable; and had travellers given us as exact descriptions of the Bedas and of the Chacrelas as Wafer has done of the Dariens, we should perhaps have discovered that the former could no more have been of European origin than the latter. What seems to give great weight to this notion is, that among the negroes there are also white children born of black parents. Of two of these white negroes we have a description in the history of the French Academy; one of the two I saw myself; and we are assured there are not a few to be met with in Africa among the other negroes.

"From what I have myself observed, independently of the information of travellers, I have no doubt that these white negroes are negroes degenerated from their race. Instead of being a peculiar and established species of men, they are only particular individuals who happen to form an accidental variety. In a word, they are among the negroes what Wafer says our white Indians are among the yellow Indians, and what to all appearance the Chacrelas and the Bedas are among the brown Indians. Still more singular it is, not only that this variation never happens but from black to white, but that all the nations of the East Indies, of Africa, and of America, in which these white men are found, are in one latitude. The Isthmus of Darien, the country of the negroes, and Ceylon, are absolutely under the same line. White, then appears to be the primitive color of nature, which climate, food, and manners alter, and even change into yellow, into brown, or into black; and which, in certain circumstances, reappears, though by no means equal to what it was, on account of its corruption from the causes here mentioned.

"Nature in her full perfection has made men white, and nature reduced to the last stage of adulteration, renders them white again. But the white of the species, or the natural white, is widely different from the white of the individual, or the accidental white. In plants, as well as in men and in animals, do we find examples of this truth. The white rose, the white gillyflower, etc., are greatly different, even in point of white, from the red roses, or the red

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gillyflowers, which become white in autumn, after suffering the evening colds and the frosty chills of that season.

"A farther proof still that these white men are in fact merely individuals who have degenerated from their species, is, that they are all less strong and less vigorous than the others, and that they have eyes extremely weak. This fact will appear less extraordinary when were collect that, among ourselves, those men, who are remarkable for the flaxen fairness of their complexions, are commonly remarkable also for the weakness of their eyes. I have remarked also that such people are often slow of hearing, and it is pretended that their dogs, which are absolutely white and without a spot, are deaf. Whether this observation is generally just, I know not; all I can assert is, that, in a number of instances, I have seen it confirmed."[1]

Flavius Josephus, in his great work on the "Antiquities of the Jews," on the other hand, in his account of the creation of the world, says that *Adam* implies, in the Hebrew language, *red*, because the first man was formed of the purest and richest kind of earth, which is of that color.

John Hunter, in his interesting and curious remarks "On the Color of the Pigmentum of the Eye in Different Animals," contained in his *Observations on Certain Parts of the Animal Economy*, unlike Buffon, advocates the view that the *changes of color in man and animals are always from the dark to the lighter tints.*

This celebrated observer says:—

"The propagation or continuance of animals in their distinct classes is an established law of nature, and in a general way is preserved with a tolerable degree of uniformity; but in the individuals of each species, varieties are every day produced in color, shape, size, and disposition. Some of these changes are permanent with respect to the propagation of the animal, becoming so far a part of its nature as to be continued in the offspring.

"Animals living in a free and natural state are subject to few deviations from their specific character; but nature is less uniform in its operations when influenced by culture. Considerable varieties are produced under such circumstances, of which the most frequent are changes in the color. These changes are always, I believe, from the dark to the lighter tints, and the alteration very

[1] The Natural History of Animals, Vegetables, and Minerals, with the Theory of the Earth in General, trans. from the French of Count de Buffon, by W. Kenrick, LL.D., vol i. pp. 269–270.

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gradual in certain species, requiring in the Canary bird several generations; while in the crow, mouse, etc., it is completed in one. But this change is not always to white, though still approaching nearer to it in the young than in the parent, being sometimes to dun, at others to spotted, of all the various shades between the two extremes. This alteration in color being constantly from dark to lighter, may we not reasonably infer that in all animals subject to such variation the darkest of the species should be reckoned nearest to the original; and that where there are specimens of a particular kind, entirely black, the whole have been originally black? Without this supposition it will be impossible, on the principle I have stated, to account for individuals of any class being black. Every such variety may be considered as arising in the cultivated state of animals; but whether, if left to themselves, they would in time resume their original appearances, I do not know.

"The color of the pigmentum of the eye always corresponds, I believe, with that of the hair and skin, especially if the animals be only of one color, but is principally determined by the hair; and the most general color is a very dark brown, approaching to black, whence it had the name nigrum pigmentum. . . .

"The human species is a striking example of the color of the pigmentum corresponding with that of the skin and hair; and though the skin and hair of one person differ very considerably from the skin and hair of another, yet it is not in so great a degree as in many animals. There are cattle perfectly white, white sheep, white dogs, white cats, and rabbits; but there are few of the human species that we can say are perfectly white. They rather pass from the black into the brown, red, and even light yellow; and we find this pigmentum, although only of one color, varying through all the different corresponding shades. In the African negro, the blackness of whose hair and skin is a great distinguishing characteristic, this pigmentum is also very black. In the mulatto, who has not the skin so dark as the African, but the hair nearly as black, this pigmentum is of a shade not quite so deep; yet still it does not approach so near to the middle tint as the skin, rather following the color of the hair. In people of a swarthy complexion, as Indians, Turks, Tartars, Moors, etc., we find the hair always of a jet black, and this substance of a much darker brown than in those that are fair. In those of very dark complexions, and having very black hair, although descended from fair parents, the same

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thing holds good. There are few species of animals, or even individuals of a species whose bodies are only of one color. Crows and some others are exceptions; but the greatest number are of two or more, being variously spotted or streaked either with different colors, or with shades of the same. Many species are constantly lighter in some parts of the body than in others, and, with a few exceptions, animals are generally lighter, as to color, on the lower, or what may be called the foreparts, than on the upper or backparts. The fair man or woman may strictly be considered as a spotted or variegated animal. In many persons the hair of the head, eyebrows, eyelashes, beard, and hair on the pubes, all vary in color. The hair of the first three may be called fœtal, and are oftener all of the same than of a different color; the last two are to be considered as adult hair, and are commonly alike in color, which yet frequently varies from that of the fœtus, which last is more liable to change its color than the other; and the change is generally that of growing darker, especially on the head and eyelashes. This difference in the color of the hair on different parts of the body is not so observable in those nations who are dark or swarthy, as in people inhabiting many of the northern climates."[1]

But few observations have been recorded which show any actual disease in the albino. The extreme sensitiveness of the albino to the action of light is not due to any peculiarity of organization in the nervous structures; but to the absence of the black pigment, which has the important office of absorbing superfluous portions of light, and thus as it were deadening its effects. As the ultimate distribution and arrangement of the optic nerve are the same in the retina of the eye of the albino as in that of ordinary human beings having the usual amount of pigmentum nigrum, it follows as a necessary consequence that the action of the rays of light, and especially that portion of the rays which excites active chemical change, must be far more intense in the former. This abnormal excitement of the nervous system of the albino under the stimulus of light is due not to any inherent weakness, nor to any pathological condition of the nerve centres, but simply to a physical and mechanical defect in the apparatus of vision.

It is, therefore, chiefly to the bright light and high heat of the tropics that we must attribute the apparent delicacy of albinos in Africa. The morbid condition of the skin induced by the heat is

[1] The works of John Hunter, F.R.S., edited by James F. Palmer, London, 1837, pp. 277–280.

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not observed in the European albino in cold climates. The effect of the hot sun in blistering the fair skin of the white man in warm regions is well known; and from the far greater delicacy of the skin of the albino, the blistering and cracking effects of the hot sun are far greater. From these causes, as well as from the idea of imperfection, the albino is generally regarded in Africa with a degree of compassion and even contempt. Dubois observes that they are named lepers by birth, amongst the negroes, and that when they die their bodies are not buried or burnt, but cast on dung-hills. According to Vossius, they are avoided by the other negroes, because they are supposed to be diseased; and De la Croix says the negroes regard them as monsters, and do not permit them to multiply.

Dr. Winterbottom saw a white African woman with a remarkably coarse and wrinkled skin. In this case he described the skin as dry and harsh to the touch, and marked by deep furrows; it had a reddish tinge in parts exposed to the sun, and was of a dirty white in other situations, and black spots, like freckles, of the size of a pea, were thickly scattered over the skin. Another tall and well-formed white negro had a similar rough, harsh, and freckled skin, and, another white negress had the skin of an unpleasant dead-looking white, and, although pretty smooth, beginning to assume a cracked appearance from the action of the sun.

Cook described the skin of the albino which he observed at Otaheite, as of a dead white, scurfy, and covered with white down.

As far as my experience and knowledge extend, the albino many be, nay is, most generally strong and healthy, and executes all the functions of life in a vigorous and perfect manner.

In the cases which we have recorded, the grandfather, grandmother, and mother, notwithstanding the marked tendency which they exhibited to albinism in the spots of the skin, were strong, healthy, robust, and hardy; the little living albino is one of the finest looking and most sprightly negro children that I have ever seen; the albino negro man pursues his daily labor and enjoys excellent health; and of several other instances which have come under my observation, of grown negro and Anglo-Saxon albinos, male and female, the usual amount of health and physical strength was enjoyed.

In two cases of albino negro women that have come under my observation, the individuals have been able to perform active labors, and have borne children to their husbands.

The albinos which I have observed amongst animal have been

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neither diseased nor wanting in strength, nor the power to propagate their species, and even to transmit the characteristic color to their offspring. In my boyhood I attended school in an extensive forest, on the coast of Georgia, and upon the banks of a small stream about a quarter of a mile from the school-house, a family of white rabbits of the common species of the country (Lepus sylvaticus) bred for years, and were seen from time to time by the little company attending the log school-house.

The ability of the domestic white rabbit, and of the tame white mouse to procreate, and to propagate a special variety, is known to all naturalists.

The original color of the domesticated rabbit (Lepus caniculus) in its wild state in England and on the continent is, upon the upper surface, uniformly gray, without varieties in its native warrens; yet in its domesticated state the European rabbit has produced an *albino race*, which has been propagated for centuries.

Dr. Bachman, of Charleston, South Carolina, has kept this variety separate from others, and observed it closely, and he affirms that in the period of twenty years, when there must have been a hundred generations in that prolific breed, not one of a different color was produced, nor did they exhibit the slightest tendency to disease. The same may be said of the white mice, the albino rats, and the albino ferrets of England and France.

In proof of the assertion that albino varieties sometimes originate and may be propagated continuously amongst wild animals, Dr. Bachman cites the existence of a family of white raccoons (Procyon loter), which had existed in Christ Church parish, near Charleston, for many years, from which neighborhood this distinguished naturalist had from time to time received specimens. Dr. Bachman observed that about half of these white raccoons had the pink eyes of the albino.

Gray, of London, has described a raccoon from Texas, under the name of *procyon nivea*, which Dr. Bachman ascertained, by an examination of the original specimen, to be of this white variety. Dr. Bachman has also seen several families of the Carolina gray squirrel, that were albinos. This close observer and accomplished naturalist has said that he had "not a doubt that could the albinos of various species of animals be prevented from mixing with the common varieties, they would perpetuate their breeds possessing this peculiarity."[1]

[1] Doctrine of the Unity of the Human Race, pp. 187–189.

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It is well established, therefore, that in all the lower animals, albinos mated with each other produce albinos that are perfectly healthy, and propagate as rapidly as any other varieties.

It has been still further shown by naturalists that the albino may lose the pink color of the eye, and, at the same time, regain the usual tolerance of light and strength of vision of those who have the choroid coat of the eye of a black color.

Dr. Bachman examined about a dozen specimens of Virginia deer, that were either altogether or nearly white, and found but one possessing pink eyes; and he has also observed that in the domesticated white rabbits and other quadrupeds, as well as in many wild birds, the smallest dark spot on the quadruped or bird is followed by the usual natural color in the eyes; in a white rabbit, having a black spot on one of its ears, the eye on the same side was of the common color, and the opposite one pink; and in domesticated animals, birds, horses, cows, sheep, goats, pigs, turkeys, geese, ducks, fowls, and pigeons, that are of a uniformly white color, pink eyes are scarcely ever observed.

John Hunter has some interesting observations upon the same subject. When treating of the *color of the pigmentum of the eye in different animals*, he says:—

"In animals which are variegated let us observe the color of this pigmentum, and we shall find it regulated by some general principle, and corresponding with the color of the eyelashes. The magpie, for instance, is nearly one-third or fourth part white; and the two colors, if blended, would make the compound gray; but the eyelashes being black the pigmentum is black also. We sometimes meet with people whose skin and hair are very white, and yet the iris is dark, which is a sign of a dark pigmentum; but if we examine more carefully we shall also find that the eyelashes are dark, although the eyebrows may be the color of the common hair. . . . .

"In people remarkably fair, whether they are of a race that is naturally so, or what may be called monstrous in respect to color, as white Æthiopians, still we find this pigmentum following the color of the skin and hair, being in some of a light brown, and in others almost white, according to the color of the hair in such people. . . . .

"The variation of color appears most remarkable when a white starts up, either when the whole species is black, as in the crow or blackbird, or when only a certain part of the species is black (but

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permanently so), as a white child born of black parents; and a perfectly white child, whose hair is white, and who has the pigmentum also white, though born of parents who are fair, should as much be considered as a play of nature as the others. All these *lusus naturæ*, such as the white negro, the pure white mice, etc., have likewise a white pigmentum corresponding with the color of the hair, feathers and skin."[1]

In some cases children born with red eyes and white hair, in their progress to maturity gradually lose these peculiarities, and their eyes, hair, and complexions assume more natural colors.

Professor Graves, of Dublin, has given the following illustration of this change in the albino:—

"Last year Dr. Ascherson informed me that he had seen a case of the after development of the pigment of the eye in an albino boy three years old. This child had at its birth white hair, and violet-colored eyes, with dark red pupils. At the end of the third year its hair was light brown, and its eyes were blue, but they had still, in a remarkable degree, though less so than before, that restlessness peculiar to albinos. This was the only case of the kind I ever heard of, except that communicated by Michäelis, in Blumenbach's *Medicinische Bibliothek*, vol. iii. p. 679; which, however, rests only on the uncertain authority of some peasants. Singularly enough, I had soon the good fortune to meet with a similar case myself. In my younger days there were two children, a brother and sister living near me, who presented such striking symptoms of leucosis in their eyes, hair, and skin, that they were recognized as albinos even by non-medical persons. My attention was lately drawn to them by an advertisement in the papers in which their name occurred; and I learned that the brother had become a tobacconist; but to my great astonishment, on going to see him, I found that his eyes had changed from violet-red to gray, and his hair from white to light brown, and that the susceptibility of the eyes to the light had greatly diminished."

To the prolific, intelligent, and vigorous nature of albinos, several writers have testified.

Mr. Jefferson describes the seven examples of albinos, in the negro race, which came under his observation, as uncommonly shrewd and quick in their apprehension and reply. Three of these were sisters, having two other full sisters who were black.

[1] Loc. cit., pp. 280-281.

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Two of them bore black children to black men; another white albino negress had a black daughter by a black man; and another albino negress much freckled, and with very weak eyes, bore an albino child to a black man. All the individuals observed by Mr. Jefferson were well formed, strong, and healthy.

M. Sachs, who gives a minute account of this peculiarity in his own person and that of his sister, repels the charge that the intellect of the albino is weak.

Winterbottom mentions cases of fertility among albinos, and in an example which he mentions, the daughter of two mulattoes, born in Nova Scotia, who had all the negro features, with woolly hair of a dirty white color, and a skin equalling in whiteness that of a European, there were no signs of cachexia or leprosy, and the skin was without anything disagreeable in appearance or texture.

No signs of disease were discovered in the two Swiss youths described by Blumenbach and Saussure; and Pallas considered the notion of disease in the African albinos as unfounded.

Dr. William Lawrence considers the view that albinos labor under a diseased state as completely incorrect; in fact this distinguished surgeon and physiologist, in his *Lectures on Physiology, Zoology, and the Natural History of Man*, affirms that they do not exhibit a single character of disease; all their functions are executed as in other persons; they are born of healthy parents, occur amongst the robust and hardy members of savage tribes, and can both beget and conceive.

Dr. Lawrence sustains this assertion by ample and uncontrovertible examples.

Dr. Bachman says that, to his certain knowledge, both sexes of the albinos are prolific, and cites examples, proving this proposition, occurring in Virginia and South Carolina. And we conclude this section of our inquiry in the language of this naturalist:—

"If, as we here perceive, nature makes so wide a stride, as without a single step black races of quadrupeds or birds are converted by the process of nature into white races, and a black pair in the human race produces a white progeny, we may learn how many phenomena there are in nature which the knife of the anatomist cannot reach, and all the investigations in physiology are unable to fathom. Even admitting that the case cannot be reversed in regard to our species, and that the white pair never produces a black offspring, they will recollect that they have afforded us no evidence that our white race, in the present acceptation of the term,

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is of the color of the original man; that, therefore, as in conformity with the other operations of nature, a variety does not return to the characteristics of the original species, so we can have no well grounded belief that any change will convert the white into a colored man; on the other hand, if the original color was dark, whatever may have been the shade, this was the very color of the races in which, in all ages and countries, the greatest number of white varieties have been produced. In the production of these albinos, however, we perceive at least how suddenly nature carries one extreme to the other, and how many admonitions are offered us not to pronounce a hasty judgment, without being supported by such facts as will warrant us in arriving at a correct conclusion."[1]

SECTION V.

SEAT AND NATURE OF THE CHANGE OF COLOR IN THE ALBINO.

EYES.—M. Blumenbach accounted for the red color of the pupil, and the extreme sensibility of the eye to light, by the absence of the *pigmentum nigrum*.

He observes that Simon Pontius, in his treatise, "De Coloribus Oculorum," long ago remarked that the interior membranes of blue eyes are less abundantly supplied with that brown or blackish mucus which, about the fifth week of conception, covers all the interior parts of the eye, and are therefore more sensible of the action of light. He adds that this sensibility of blue eyes is very conformable to the situation of northern people during their long twilight; and that, on the contrary, the deep black eyes of negroes enable them to bear the strong glare of the sun's beams in the torrid zone. As to the connection between the red color of the eyes and the whiteness of the skin and hair, Blumenbach held that it is owing to a similarity of structure. This black mucus is formed, as he asserts, only in the delicate cellular substance, which has numerous bloodvessels contiguous to it, but contains no fat, like the inside of the eye, the skin of the negro, the spotted palate of several domestic animals, etc., and the color of the hair generally corresponds with that of the iris.

About the same time, M. Buzzi, surgeon to the hospital at Milan, demonstrated by dissection the truth of the hypothesis of M. Blumenbach.

[1] Loc. cit., p. 191.

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In dissecting the body of a peasant who died at the age of 30 years, in the hospital of Milan, of a pulmonary disorder, and who was remarkable for the uncommon whiteness of his skin, hair, beard, and all the other covered parts of the body, M. Buzzi found the iris of the eyes perfectly white, and the pupil of a rose color; and the eyes were altogether destitute of the pigmentum nigrum, or black membrane, which was not discernible either behind the iris or under the retina. Within the eye he found the choroid coat extremely thin, and tinged of a pale color, by vessels filled with discolored blood. The skin, when separated from different parts of the body, appeared to be almost wholly divested of the rete mucosum, nor was the least trace of it to be discovered by maceration, even in the wrinkles of the abdomen, where it is most abundant and most visible. The whiteness of the skin and hair were ascribed by M. Buzzi to the absence of the rete mucosum, which in his judgment gives the color to the cuticle and to the hairs that are scattered over it. In proof of this opinion, he alleges a well-known fact, that if the skin of the blackest horse be accidentally destroyed in any part of the body, the hairs that afterwards grow on that part are always white, because the rete mucosum which tinges these hairs is never regenerated with the skin.

The peculiar appearance of the eye of the albino is due to the absence of pigment from both portions of the vascular tunic or *uvea* of the eyeball, the choroid, and the iris.

The color of the iris depends upon the fine vessels which are so numerous in its composition, and that of the pupil on the still greater number of capillaries, which almost entirely form the choroid membrane; the black pigment which lines the choroid, as well as the coloring substance of the iris, being defective, a red tinge is imparted to the light which penetrates the transparent blood-vessels of the iris and the anterior part of the eye. This absence of the black pigment, which has the important office of absorbing superfluous portions of light, renders the eye preternaturally sensible to this stimulus.

In the natural eye, the pigmentum nigrum which forms the inner layer of the choroid and rests upon the external thicker and vascular layer of this membrane, is a continuous purely cellular layer completely investing the inner or vascular surface of the choroid, and consisting, as far as the ora serrata, of a single layer of almost regularly hexahedral, contiguous cells, disposed in an elegant mosaic manner, and filled with brownish-black pigment.

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From the ora serrata onwards, the pigment cells are disposed in several layers, and are so entirely filled with pigment that the nuclei even are scarcely visible. The pigment of the choroid consists of minute, flattened, oval corpuscles, the largest of which are not more than 0.0007 of a line long. In albinos, only the pigment of the hexahedral choroid cells is wanting; the cells which, in other animals, contain this coloring matter, forming the pigmentum nigrum, exist, but they are perfectly colorless. The red color, therefore, of the eye of the albino, is due, not only to the absence from these cells of the pigmentary matter, but also to the blood filling the vessels of the vascular layer of the choroid.

SKIN.—The varieties in the color of man and animals have their seat in the epidermis, or outer coating of the body, external to the true skin; and to this exodermal structure must be referred also such appendages as the hair, feathers, horns, and hoofs.

Careful microscopical research has shown that the *rete mucosum* of the epidermis, first described by Malpighi, and in which the color of the skin resides, is not a distinct membrane, but is nothing more than a soft epidermic layer of delicate polyhedral cells, which are incessantly transformed into the flattened and comparatively dry scales of the cuticle, and are constantly reproduced from the surface of the dermis. The three distinct parts of the integument of the negro described by Albinus, the four layers described by Cruikshank in his series of observations on the skin of the negro affected by the smallpox, as well as the four layers described by M. Gaultier, and M. Flourens, interposed between the cuticle and the true skin, have all been shown by the careful microscopical researches of Henlé, Parkinge, Schwann, Kölliker, Bowman, and others, to be not distinct membranes, but only the complicated cellular structure of the outer skin. The series of layers of cells which compose the epidermis are continually wearing off at the external surface, and are being as continuously renewed at the surface of the true skin, so that the newest and deepest layers become the oldest and most superficial, and are at last thrown off by slow desquamation; and in their progress from the internal to the external surface of the epidermis the cells undergo a series of well-marked changes involving not only their form, but also their chemical constitution and color.

The innermost layer (*rete mucosum*) resting upon the true skin, in which the coloring matter of the different races resides, consists of small, soft, easily destroyed nuclei and cells in various stages of

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development, held together, according to most observers, by a tenacious semi-fluid substance. In albino individuals, both of the negro and other races, and in the pure unmixed white races, this soft epidermic layer is colorless, and, like the cuticle, translucent, and hence it allows the color and vascularity of the dermis to be seen; in the negro, its cells, especially the deeper ones, are filled with brown or black pigmentary matter, which produces the characteristic color of the race; smaller quantities of the same material give rise to the various shades of complexion of other races, and of different individuals of the same race, and even of different parts of the skin of the same person.

The sunburnt complexion, the periodic changes in the color of the nipple in the female, the dark moles and congenital marks of the skin, and freckles in the fair complexion, are all due to the development or increase of the same coloring matter in the developing cells of the deepest portion of the epidermis.

According to Henlé, the dark color of the negro is caused by the presence of pigment cells in this portion of the epidermis, resembling those of the choroid in almost every respect save their size, which is somewhat less. These are intermixed with colorless cells, and on the proportion of the two, the depth of the color of different parts depends. According to the same authority, the darker parts of the European skin owe their color to pigment cells like those of the negro, only still smaller in size, less defined in their outline, and less numerous. In the negro, Henlé found the cells which contain the black pigment aggregated, especially on those parts of the rete which project and correspond with the furrows on the surface of the cutis. They resemble in form the cells in the pigment of the eye, that is, they are sometimes completely hexangular, but more commonly only approximating to this shape, being polyhedral, or irregularly spherical. Their length, according to Henlé, reached to 0.0039–0.0062 line; their breadth to about 0.005 line.

Krause affirms that the dark color of the cuticle, both of the negro and white races, depends chiefly on the presence of cells which have dark brown nuclei, the substance of the cell being also tinged, but less deeply than the nucleus, and the color being diffused through the mass, and not caused by molecules. He admits that a few true pigment cells are found in the negro's skin.

According to Bowman, the coloring matter, however various in quantity and hue, consists of oblong or oval grains of extreme minuteness ($\frac{1}{25,000}$ of an inch in their long diameter), and occupy-

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ing the interior of some of the epidermic particles; in the negro it accumulates in large quantity and completely envelops the nuclei, immediately resting upon the cutis. On examining a vertical section of the whole cuticle of the negro, the coloring matter will be seen to gradually diminish towards the surface, and no true line of demarcation can be discovered between the two portions; and in the most deeply colored portions it is even possible to discover a sort of stream of colored grains advancing towards the surface.

According to Kölliker, the horny layer of the epidermis, in the white races, is colorless and transparent or slightly yellowish, the mucous layer yellowish-white or brownish. The color is deepest in the *areola* and in the nipple, passing even into blackish-brown, especially in women during pregnancy and after they have borne children; it is less intense in the *labia majora*, the *scrotum*, and the *penis*, where for the rest it varies greatly, being sometimes almost entirely absent, sometimes very distinct, and is least considerable in the axilla and around the anus. Besides these situations, which in most individuals are more or less tinged, in the dark complexioned more than in the fair, a lighter or more deeply colored, frequently very dark pigment is deposited in various other localities, in the stratum Malpighii; in pregnant women in the *linea alba*, and in the face (rhubarb-colored spots); in persons who are exposed to the sun, in the face, especially the brow, chin, and cheeks; in the neck, the thorax, the back of the hands, the forearm; and in dark persons over almost the whole body. These tints, according to Kölliker, are not produced by special pigment cells, but are seated in the common cells of the mucous layer, round whose nuclei a finely granular or more homogeneous coloring matter or actual pigment granules are deposited. When the skin is only slightly colored, it is mostly only the neighborhood of the nuclei, and in fact only the lowermost layers of cells, which are implicated, so that in perpendicular sections the papillæ are seen to be surrounded by a yellowish fringe; dark shades are produced by the extension of the color to two, three, four, and more layers of cells, and over the whole cell contents; sometimes by a darker coloration of the deepest layer of cells; the two conditions commonly coexisting. In the negro, and the other *colored human races*, it is only the epidermis which is colored, whilst the *corium* completely resembles that of Europeans. The pigment, however, is far darker and more abundant. In the negro, in whom, as regards the arrangement and size of the cells, the epidermis is precisely like

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that of the European, it is the perpendicular cells of the deepest part of the mucous layer which are darkest (dark brown or blackish-brown), and they form a sharply marked fringe contrasted with the clear *corium*. To these succeed clearer but still brown cells, which are accumulated particularly in the depressions between the papillæ, but are also found on their points and lateral portions in many layers; finally at the boundary close to the horny layer there follow brownish-yellow or yellow, or rather pale, more transparent layers. All these cells are colored throughout, with the exception of their membranes, and especially the parts round the nuclei, which, in the internal layers, are by far the darkest portions of the cells. The horny layer of the negro also inclines to yellow or brownish. In the yellowish skin of the Malay head in the anatomical collection at Würzburg, Kölliker found the same appearance as in a dark-colored European scrotum.

This distinguished microscopist and anatomist concludes from his investigations, "*that the epidermis of the colored races is in no essential point distinguishable from the colored regions in the white man, and it even agrees in nearly all respects with that of certain localities* (*the areola of the nipple, for instance*)."

Schwann has shown that the chemical properties of the cells of the epidermis become modified as they pass through their various changes and approach the surface, becoming finally hard, horny, and dry, and almost identical in composition with hair, horns, and hoofs; and there can be but little doubt but that the decrease of color in the superficial laminæ in the colored races is due to this chemical change which gradually takes place in the interior of the epidermic particles.

It is therefore more just to look upon the cuticle as a continuous cell-growth evolved from the superficial surface of the cutis or true skin; and the idea that it was formed of distinctly organized membranes, continuous and independent of the contiguous structures, was inferred from the crude and imperfect methods of dissection and examination with the naked eye. By the simple and comparatively rude processes of maceration and dissection apart from microscopical examination, the epidermis from the different physical and chemical properties of the different layers of cells was readily divided by the older anatomists into different layers or membranes, as they expressed it; but the results of such method of investigation hardly warrant the conclusion of M. Flourens and others, that

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the skin of the negro is specifically different from that of the white race.

Many facts, recorded by various observers, are wholly unintelligible, if the proposition maintained by M. Flourens be true.

It is well known that disordered states of the constitution may occasion marked changes in the complexion of the white races.

Malarial fever renders the complexion sallow and dusky. Dr. Strach mentions the case of a man who, after a fever, became as black as a negro. We have before considered the changes in the color of certain portions of the skin during the period of pregnancy.

Bowman mentions a French peasant, whose abdomen became entirely black during each pregnancy. Camper has given an account of a female of rank who had naturally a white skin and beautiful complexion, but whenever she became pregnant began immediately to grow brown; after delivery the dark color gradually disappeared. Blumenbach possessed the part of the skin taken from the abdomen of a beggar, which was as black as the skin of an African.

Blumenbach has seen two instances in Germans; one of a youth, the other of a man sixty years old; they both had a rather tawny skin, marked here and there with various sized spots of the clearest white. They appeared first in the former in infancy, and in the latter at the age of manhood.

The offspring of the black and white races may be either black or white, instead of being mixed; and in some rare cases it has been spotted.

Dr. James Parsons has recorded two singular instances which sustain this proposition.

A black man married a white woman in York, England. The woman soon proved with child, and in due time brought forth one entirely black, and in every particular of color and features resembling the father, without the least participation from the mother. This was thought a very singular case, because people naturally expect the issue of such a marriage would be tawny; which indeed is the usual effect produced by the congress of black and white persons. The second case was of a black man, servant to a gentleman who lived in the neighborhood of Gray's Inn. He married a white woman who lived in the same family; and when she proved with child, took a lodging for her in Gray's Inn Lane; when she was at her full time, the master had business out of town, and took his man with him, and did not return till ten or twelve days after

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the woman was delivered of a girl, which was as fair a child to look at as any born of white parents, and her features exactly like the mother's. The black, at his return, was much disturbed at the appearance of the child, and swore it was not his; but the nurse who attended the lying-in woman soon satisfied him; for she undressed the infant and showed him the right buttock and thigh, which were as black as the father, and reconciled him immediately to both mother and child. Dr. Parsons was informed of the fact, and went to the place, where he examined the child, and found it true; this was in the spring of the year 1747, as his notes specified which he took on the spot.[1]

A negress had twins by an Englishman; one was perfectly black, with short woolly curled hair; the other was light, with long hair.

Dr. Winterbottom says that in a family of six persons, which he knew, one half was almost as light colored as mulattoes, while the other was jet black. The father was a deep black, the mother a mulatto.[2]

We have already given examples of negroes who were gradually changed into spotted and even white persons, without any accompanying disease.

Dr. Gustav Simon, of Berlin, after a careful investigation of the various discolorations, or diversities of hue, which make their appearance on the skins of Europeans, including healthy and natural varieties of tint, and those which occur in morbid states of the system (discoloration of the areola mammarum, brown discoloration of circumscribed spots, *nævi materni*, or congenital spots, moles, summer freckles, lentigo), arrived at the important conclusion that they depend upon the presence of similar cells filled with pigment, which impart the color to the skin of the negro and the dark races of mankind.

The correctness of this conclusion has been established by the investigations of Krause, Bärensprung, and Kölliker. These authors have also shown that in certain diseased states of the skin, as in ichthyosis, and in cicatrices after chronic inflammation of the skin, the pigment may be developed directly from the blood-corpuscles, and may be deposited in the corium and papillæ.

A colored epidermis may be also produced by a parasitic vege-

[1] Philosophical Transactions, 1765, vol. lv. p. 45.

[2] Laurence's Lectures, p. 205.

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table growth, as in yellow spots of ephelides, or pityriasis versicolor. Dark colorations of the white races may also arise from a deposition of the coloring matters of the bile, and also of certain metallic substances, as oxide of silver. Such cases therefore must be carefully distinguished from the foregoing discolorations of the skin.

The greatest variations of color are witnessed among animals and birds; and these marked changes are not confined to domesticated animals and birds.

Not only may white sheep produce black lambs, and every variety of color spring up in the same drove of horses, herd of cattle, and flock of ducks and fowls; but many species of wild birds and quadrupeds present themselves under two or more distinct liveries in the course of the year.

Dr. Bachman, in an attempt to explain the process of nature in which these changes are produced, says:—

"These semi-annual changes in color are not confined to such species as have a constituted predisposition to such phenomena, but they spring up from causes which no one is able to explain, in species where color is generally uniform.

"We received from a friend a wild turkey, caught in a trap. At the moulting season, in the following summer, the new feathers came out nearly white, but after some weeks gradually returned to the original color. Our friend, Dr. Campbell, of Charleston, directed our attention to a top-knotted hen, on his premises, which had been received from Baltimore, whose color had been originally black, but which, after the moulting season, had become pure white, and continued so for a year, until the next moult, when it once more became black. Thus it continued for several years to alternate between the two opposite colors. All this while the bird remained in perfect health, and laid the usual number of eggs.

"Horses brought across the Atlantic are found to have white patches of hair over those portions where the skin had been rubbed off on the voyage. We perceive from hence how easily the coloring matter under the skin becomes deranged, and from what slight causes it imparts an entirely opposite color."

The congenital varieties arising amongst domestic animals may, as is well known, be established as permanent varieties, if the individuals with these new characters constantly intermix. Thus, the white rabbit and ferret have become fixed varieties. And facts are not wanting to show that similar varieties of color may be propagated in the human race; and in addition to those which we

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have already recorded, we will quote the testimony of Hon. Joel R. Poinsett, as given by Dr. Bachman, to show that a race of spotted men exist in Mexico. "Saw, in the capital of Mexico, a regiment to number of six hundred men, called Los pintado, who were all spotted with blue spots in some parts of the body. The people are found along the Pacific coast just north of Acapulco. This regiment was commanded by Gen. Alvarez." Dr. Bachman continues: "These persons were all in fine health, and propagated these varieties from generation to generation. What there was in food, the climate, or the geological structure of the western coast of America, to produce this strangely-colored variety in the human species, we are unable even to conjecture. It was certainly not disease, as Mr. Poinsett represents them as a regiment of fine, healthy-looking men, in which there was not a solitary individual who was not spotted in this manner."[1]

Dr. James Cowlis Prichard, in his learned and elaborate work on the *Natural History of Man*, has well remarked that "it will be worth while to observe that the epidermic or horny tissue, corresponding in many tribes of animals to the extra-cutaneous texture which is the seat of variations in color, and in the hair of human beings, is precisely that part of the organic system which undergoes the most striking, and even surprising, alterations. It is the tissue which displays the variety of horns in tribes possessed of such appendages, some races of the same species having a great profusion of frontal antlers, while others are entirely destitute of them; and these variations, as we have seen upon evidence, were known actually to arise within the limits of one stock."

The hoofs, which are parts of the same structure, undergo similar changes; and in the remarkable instance of the solid-hoofed swine, there appears an imitation of the really specific structures of other tribes of animals. The appearance and structure of the epidermis undergo remarkable changes during the domestication of many wild animals. Thus, the rough, tuberculated skin of the wild asses of Persia disappears on domestication. And the history of the remarkable Porcupine family of England not only affords a striking illustration of the anomalies which display themselves in the textures external to the true skin, and of the wide range of variation to which those external coatings of the human body are subject, but it also illustrates the possibility of transmitting these peculiarities, unchanged, from parent to child.

[1] Loc. cit., p. 182.

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"It appears, therefore, past all doubt," says Mr. Baker, who communicated an account of the father of the Porcupine family to the Royal Philosophical Society of London, "that a race of people may be propagated by this man, having such rugged coats and coverings as himself; and if this should even happen, and the accidental original be forgotten, it is not improbable they might be deemed a different species of mankind."

From these researches upon the changes of the color of the skin in the albino, in its relations to similar changes in the different races of man, and in the lower animals, we feel justified in drawing the following conclusion.

Between the epidermis of the white and the colored races, there is an identity of structure, and no such organic difference as indicates a diversity of origin and species of the different races. The only difference is, that the young epidermic cells of whites contain little or no coloring matter, or pigment granules, except in certain situations; while those of the black race are filled with coloring matter. The marked variations of hue in the same race, the sudden appearance of albinos in the races of man and animals, and the possibility of propagating this peculiarity; the gradual, and sometimes even sudden, appearance of pigment cells in various parts of the epidermis of the white races, and the gradual disappearance of the pigment cells from circumscribed portions, and even from the entire epidermis of the negro, all show that this difference can scarcely be regarded as permanent or structural, but is one of degree rather than of kind, and that the different complexions of mankind are not permanent and specific characters.

HAIR.—The hair of the negro albino is peculiarly adapted for investigation and comparison with the hair of other varieties of the human race; and I spared no effort to obtain accurate results.

The hair of the mother, father, grandmother, and of several other members of the family, connected by marriage and by blood with the albino children, as well as the hair of a number of other "black, woolly-headed, flat-nosed, and thick-lipped" negroes, and of mulattoes, quadroons, half-breed Indians and negroes, and of American and European white men, women, and children, and the wool, hair, and fur of several varieties of sheep and goats, and of various animals, as the tiger, panther, conger, bear, dog, mink, mole, muskrat, deer, etc., were carefully examined under the microscope, and subjected to the action of chemical reagents.

It is not my intention at the present time to enter into all the details of this investigation, especially as the differences in the hair,

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wool, and fur of different animals would require long and elaborate descriptions, and careful drawings for their elucidation.

The hairs of the heads of the two albino children, and of the albino man, were, as in the case with the hair of the different varieties of the human race, composed of three well-defined portions.

In presenting the results of this inquiry, we will proceed from the exterior to the interior of the structures composing the hair of the head.

1st. The cuticle, or delicate external investment of fibrous substance, investing and closely united to the cortical substance.

The cuticle was marked by numerous, dark, irregular, and jagged lines, formed by the projecting edges of the component scales. In some parts of the outline of the hair, when viewed under high magnifying powers, small serrations were observed, which were due to the edges of the cuticular plates, which are directed upwards and outwards along the shaft.

By the use of a solution of potassa we were able to separate the cuticle, and to determine that it was composed of altered cells in the form of transparent flat plates. The slight bristling or serration of the edges in some hairs was due to the implicated manner in which these plates were disposed; and in many hairs, and in parts of the same hair, this serration was scarcely observed. Those writers are in error, however, who assert that the edge of the hair as viewed in profile is perfectly smooth. A perfectly smooth profile is manifestly impossible in a shaft covered with *plates*. This slight serration, however, originally must not be confounded with the deep regular serrations of wool.

I found a magnifying power of 430 diameters the best for the clear definition of the edges of the cuticular plates enveloping the cortical substance of the hair.

The appearance of the cuticle of the white hair of the albinos differed in no respect from that presented by the white hair of aged negroes, or of aged white persons.

The examination of the cuticle of the jet-black hair of the negro required more time and care, as it was not so readily distinguishable under the microscope, on account of the intense black of the entire structure. By the use of reagents, however, and especially of liquor potassæ, it was possible to detach the cuticle, and it was found to differ in no respect, either in its arrangement or general characters, with the exception of its color, from that of the albino or of the aged negro. The same result was observed upon a care-

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ful examination and comparison with the hair of the white race, male and females, and of different ages.

I could perceive no essential, marked, or specific difference between the cuticle of the hairs of the albino, the black negro, the mulatto, quadroon, half-breed Indian and negro, and the white race.

On the other hand, the cuticle of the wool and fur of various animals is far more varied in its markings, and the serrations formed by the individual plates more distinct.

The wool of the sheep is far smaller in diameter than the hair of the human head, and the cuticular plates are more fully and regularly developed, and are not so thoroughly fused into each other.

The chief difference between wool and hair appears to be in the mode of development and disposition of the plates composing the cuticle, and the smaller size and more flattened and ribbon-like form. Hair and wool, although differing in these peculiarities, must be considered as intrinsically the same in their horny texture, relations to the skin, mode of development, and growth.

Not only are both wool and hair found in the covering of most animals, but the relative proportions of each may be altered by climate and other influences.

It was known from the earliest times that wool possessed the property of felting, but it has been shown only at a comparatively recent date, by Mr. Youatt, that the true cause of the felting property of wool, and at the same time its distinguishing character, when contrasted with hair, consists in its external serrated structure.

M. Monge was the first to assert that a feathered, or barbed edge, must be the structure of the surface of wool; that "the surface is formed of lamella, or little plates, which cover each other from the root to the point, pretty much in the same manner as the scales of a fish cover that animal from head to tail, or like rows placed one over another, as is observed in the structure of horns."

It does not appear, however, that M. Monge actually saw this peculiar structure under the microscope; and the credit of the demonstration rests with Mr. Youatt, who thus announced his discovery.

"On the evening of the 7th of February, 1835, Mr. Thomas Plint, woollen manufacturer, resident at Leeds; Mr. Symonds, clothing agent, of Cateaton Street, London; Mr. T. Millington, Surgeon of London; an esteemed friend, Mr. E. Brady, veterinary surgeon, at that time assisting the author in his practice; Mr. W.

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H. Coates, of Leeds, veterinary pupil; Mr. Powell, the maker of the microscope; the author himself, were assembled in the parlor. A fibre was taken from a Merino fleece, without selection, and placed on the frame, to be examined as a transparent object. A power of 800 (linear) was used; and after Mr. Powell, Mr. Plint had the first ocular demonstration of the irregularities in the surface of the wool, the palpable proof of the cause of the most valuable of its properties, its disposition to felt. The fibre thus looked at assumed a flattened, ribbon-like form. It was of a pearly-gray color, with faint lines across it. The edges were evidently hooked, or more properly, serrated; they resembled the teeth of a fine saw. They were somewhat irregular in different parts of the field of view, both as to size and number. The area of the field was one-fortieth of an inch in diameter. By means of a micrometer, we divided this into four, and we then counted the number of serrations in each division. Three of us counted all four divisions—for there was a difference in some of them. The number was set down privately, and it was found that we had all estimated it at fifteen in each division. Having multiplied this by four, to obtain the whole field, and that by forty, the proportionate part of an inch, of which the field consisted, we obtained, as a result, that there were 2400 serrations in the space of an inch, all of which projected in the same direction, viz., from the root to the point. . . . . We next endeavored to explore the cause of this serrated appearance, and the nature of the irregularities on the surface, which might possibly account for the production of these tooth-like projections; we therefore took another fibre, and mounted it as an opaque object. . . . . We were presented with a beautiful glittering column, with lines of division across it, in number and distance seemingly corresponding with the serrations that we had observed in the other fibre, that had been viewed as a transparent object. It was not at once that the eye could adapt itself to the brilliancy of the object; but by degrees these divisions developed themselves, and could be accurately traced. They were not so marked as the inverted cones which the bat's wool presented, but they were distinct enough; and the apex of the superior one, yet comparatively little diminished in bulk, was received in the excavated base of the one immediately beneath; while the edge of this base, formed into a cup-like shape, projected, and had a serrated or indented edge, bearing no indistinct resemblance to the ancient

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crown. All these projecting edges pointed in a direction from root to point."

The difference, then, between wool and hair, according to Mr. Youatt, are as follows: The fibre of wool is crisped or curled, the curls increasing according to the firmness and felting property of the wool; and in addition to this it is decidedly serrated; whilst hair, though sometimes curled, but in a very limited degree in comparison with wool, has its edge only scaly or rugose, and never truly serrated; and hence it is that hair, though it will entangle and barb to a certain extent, will not fold into a compact mass.

Dr. Eble, as quoted by Dr. Prichard, who examined with the microscope the wool of the Merino and of the Chinese sheep, says that all wool displays filaments twisted and matted in all directions; and, moreover, the shaft of the filament of wool does not keep an uniform calibre, but appears thickened here and there, and often swelled out with an appearance of knots. He adds, "I could everywhere distinguish clearly the so termed medulla or pith—the transparent canal; and could accurately discriminate between this and the cortical substance. Yet in the various proportions which these parts bear to each other is to be found the chief difference between the finest and coarsest wool. The cortical parts appeared in both almost equally thick and untransparent, at least near the edge. But the canal in common wool seemed divided into more numerous spaces, resembling irregular cells; while in the wool of the Merino sheep the cells appear more regularly arranged. The whole canal of the sheath seems to be separated by regularly interposed fine transverse laminæ. The hair of the Thibetan goat, of which the cashmere shawls are made, approaches in its texture very nearly to the Merino wool, only it is smaller in the diameter of the sheath, and the transverse laminæ appear not so regularly placed. The Chinese sheep has wool, and interspersed among it rough coarse hair."

In the wool of the bat the scales are so prominent as to produce the appearance of a series of cups, placed one in another, and having indented edges; the wool of the rabbit is fine, with sharp angular serrations, whilst the hair is covered with a scaly incrustation, and cannot be said to be serrated; the wool of the tiger, bear, seal, and Italian wolf-dog, have distinct and numerous serrations, while the hair of the animals is covered with scales like the back of a sole.

These well-known examples, which have been given by Mr.

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Youatt and others, illustrate the difference between wool and hair; it must be acknowledged, however, that we need an extended investigation of this subject, embracing an inquiry into the mode in which changes of climate, culture, diet, and other circumstances, affect the growth and character of the clothing of animals.

2d. The fibrous, or cortical longitudinally striated substance of the hair.

In the albino, and in the white hair of the aged negro, and of the white race, these fibres are transparent; in hair of different colors they vary in the depth of the shade, and in the negro they are black. The only distinguishable difference in these fibres in the hair of different races, is the greater abundance of pigmentary matter in the hair of the negro.

In all the varieties of hair of the different races which we examined, the fibres of the cortical substance were resolvable under the action of strong chemical reagents into aggregations of flat, elongated fibre cells or plates, more firmly united longitudinally or at their ends, than in the direction of their breadth or sides.

In hair of different colors, the cortex in like manner presented various hues, and in addition contained darker spots, due to the accumulation of pigmentary matter. The accumulation of the black pigmentary matter in the cortex of the hair of the negro is immense and complete (the black is "dyed in the wool"), and the entire hair under the microscope resembled an opaque black rod.

By the application of reagents, however, it is possible to break up the component elements of the cuticle and cortex, in the hair of the negro, and by dividing the fibres and decreasing the intense black color, to reveal an entirely similar structure to that of the hair of the other varieties of the human race.

3d. The central or medullary substance was well defined in the hair of the albino, and in the white hair of old negroes.

In many of the hairs of the albino children it presented a yellowish color, and this gave the light yellowish tinge to the hair when viewed in mass.

The color of the medullary cells was also well marked and deeper in the brownish-yellow hair of the adult negro albino.

In the light hair of the white race, the medullary substance was in like manner more highly colored than the cortex and cuticle, thus establishing a close correspondence, even in the distribution in the coloring matter of the two races.

In the jet black opaque hair of the negro and mulatto, it was

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easy to demonstrate the presence of the central medullary matter, by the use of the solution of potassa. These investigations were conducted carefully, and through comparatively long periods of time. The hairs were first examined in their natural state, and then subjected to chemical reagents whilst they were still under the magnifying glass.

The assertion that the hair of the negro is without a central medullary portion, distinct from the fibrinous cortex, is incorrect; with proper care and the proper reagents, it can be demonstrated under the microscope as readily as in the hair of the albino, or in the hair of the aged of other races, and in the lighter shades of hair of the white race.

In the negro, as well as in the white race, the medulla was composed of similar morphological elements, isolated cells, differing in form and arrangement from the fibres of the cortex.

From this investigation of the hair, we conclude—

(1) *The hair of the negro albino differs in no respect from that of the black negro, and from the hair of the mixed and pure varieties of the human race, except in the absence of pigment.*

(2) *The hair of the negro is similar in its development and structure, and in its ultimate morphological elements, to that of the other varieties of the human race. Whilst the shape or roundness of the hair of the negro is not so uniform as that of the white race, mulatto, and Indian; on the other hand, there is a variation in this respect in the individual hairs, which are frequently perfectly round in some parts, and more elliptical and twisted in others. Similar variations of the form of the individual hairs are met with in the closely curled black hair of individuals of the white race.*

(3) *The hair of the negro possesses all the characteristics of hair, and is not wool.*

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PLAN OF ORGANIZATION

FOR A

NATIONAL MEDICAL ASSOCIATION.

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PLAN OF ORGANIZATION

FOR A

NATIONAL MEDICAL ASSOCIATION.

Whereas, The Medical Convention, held in the city of New York, in May, 1846, have declared it expedient "for the medical profession of the United States to institute a National Medical Association;" and,

Inasmuch as an institution so conducted as to give frequent, united, and emphatic expression to the views and aims of the medical profession in this country, must, at all times, have a beneficial influence, and supply more efficient means than have hitherto been available here for cultivating and advancing medical knowledge; for elevating the standard of medical education; for promoting the usefulness, honor, and interests of the medical profession; for enlightening and directing public opinion in regard to the duties, responsibilities, and requirements of medical men; for exciting and encouraging emulation and concert of action in the profession, and for facilitating and fostering friendly intercourse between those who are engaged in it: therefore,

Be it resolved, In behalf of the medical profession of the United States—that the members of the Medical Convention, held in Philadelphia, in May, 1847, and all others who, in pursuit of the objects above mentioned, are to unite with, or succeed them, constitute a National Medical Association; and that, for the organization and management of the same, they adopt the following *Regulations*.

I.—TITLE OF THE ASSOCIATION.

This institution shall be known and distinguished by the name and title of "The American Medical Association."

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II.—MEMBERS.

The members of this institution shall collectively represent and have cognizance of the common interests of the medical profession in every part of the United States; and shall hold their appointment to membership either as delegates from local institutions, as members by invitation, or as permanent members.

The *Delegates* shall receive their appointment from permanently organized medical societies, medical colleges, hospitals, lunatic asylums, and other permanently organized medical institutions of good standing in the United States, from the army and navy, and from the American Medical Society of Paris.

Each delegate shall hold his appointment for one year, and until another is appointed to succeed him, and shall participate in all the business and affairs of the Association.

Each local society shall have the privilege of sending to the Association one delegate for every ten of its regular resident members, and one for every additional fraction of more than half this number. The faculty of every regularly constituted medical college or chartered school of medicine shall have the privilege of sending two delegates. The professional staff of every chartered or municipal hospital, containing a hundred inmates or more, shall have the privilege of sending two delegates; and every other permanently organized medical institution of good standing shall have the privilege of sending one delegate.

No individual who shall be under sentence of expulsion or suspension from any State or local medical society of which he may have been a member, or whose name shall have been for non-payment of dues, dropped from the rolls of the same, shall be received as a delegate to this Association, or be allowed any of the privileges of a member, until he shall have been relieved from the said sentence or disability by such State or local society, or shall have paid up all arrears of membership; nor shall any person not a member and supporter of a local medical society, where such a one exists, be eligible to membership in the American Medical Association.

No one expelled from this Association shall at any time thereafter be received as a delegate or member, unless by a three-fourths vote of the members present at the meeting to which he is sent, or at which he is proposed.

Members by Invitation shall consist of practitioners of reputable

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standing from sections of the United States not otherwise represented at the meeting. They shall receive their appointment by invitation of the meeting, after an introduction from, and being vouched for by, at least three of the members present, or three of the absent permanent members. They shall hold their connection with the Association until the close of the annual session at which they are received; and shall be entitled to participate in all its affairs, as in the case of delegates, except the right to vote.

The *Permanent Members* shall consist of all those who have served in the capacity of delegates, and of such other members as may receive the appointment by unanimous vote, and shall continue such so long as they remain in good standing in the body from which they were sent as delegates, and comply with the requirements of the By-laws of the Association. Permanent members shall at all times be entitled to attend the meetings, and participate in the affairs of the Association, so long as they shall continue to conform to its regulations, but without the right of voting; and, when not in attendance, they shall be authorized to grant letters of introduction to reputable practitioners of medicine residing in their vicinity, who may wish to participate in the business of the meeting, as provided for members by invitation.

Every member elect, prior to the permanent organization of the annual meeting, or before voting on any question after the meeting has been organized, must exhibit his credentials to the proper committee, and sign these regulations, inscribing his name and address in full, specifying in what capacity he attends, and, if a delegate, the title of the institution from which he has received his appointment.

III.—MEETINGS.

The regular meetings of the Association shall be held annually, and commence on the first Tuesday in May or first Tuesday in June. The place of meeting shall be determined, with the time of meeting for each next successive year, by vote of the Association.

IV.—OFFICERS.

The officers of the Association shall be a President, four Vice-Presidents, one Permanent and one Assistant Secretary, a Treasurer and Librarian. They shall be nominated by a special committee of one member from each State represented at the meeting, and shall be elected by vote on a general ticket.

Each officer, except the Permanent Secretary, shall hold his

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appointment for one year, and until another is elected to succeed him. The Permanent Secretary shall hold his appointment until removed by death, resignation, or a vote of two thirds of the members present at a regular annual meeting.

The President and Vice-Presidents shall assume the functions of their respective offices at the beginning of the annual meeting next succeeding their election; all other officers shall enter upon their duties immediately after their election.

The President shall preside at the meetings, preserve order and decorum in debate, give a casting vote when necessary, and perform all the other duties that custom and parliamentary usage may require.

The Vice-Presidents, when called upon, shall assist the President in the performance of his duties, and during the absence, or at the request of the President, one of them shall officiate in his place.

The Permanent Secretary shall record the minutes and authenticate the proceedings; give due notice of the time and place of each next ensuing annual meeting; notify all members of committees of their appointment, and of the duties assigned to them; hold correspondence with other permanently organized medical societies, both domestic and foreign; serve as a member of the Committee of Publication; see that the published *Transactions* are promptly distributed to all the members who have paid the annual assessment, and carefully preserve the archives and unpublished transactions of the Association.

The Assistant Secretary shall aid the Permanent Secretary in recording and authenticating the proceedings of the Association; serve as a member of the Committee of Arrangements, and perform all the duties of Permanent Secretary temporarily, whenever that office shall be vacant, either by death, resignation, or removal.

The Treasurer shall have the immediate charge and management of the funds and property of the Association. He shall be a member of the Committee of Publication, to which committee he shall give bonds for the safe keeping and proper use and disposal of his trust. And through the same committee he shall present his accounts, duly authenticated, at every regular meeting.

The Librarian shall receive and preserve all the property in books, pamphlets, journals, and manuscripts presented to or acquired by the Association, record their titles in a book prepared for the purpose, acknowledge the receipt of the same, and he shall be a member of the Committee of Publication.

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V.—STANDING COMMITTEES.

The following standing committees, each composed of seven members, shall be organized at every annual meeting, for preparing, arranging, and expediting business for each next ensuing year, and for carrying into effect the orders of the Association not otherwise assigned, namely, a Committee of Arrangements and a Committee of Publication.

The Committee of Arrangements shall, if no sufficient reasons prevent, be mainly composed of seven members, of whom the Assistant Secretary shall be one, residing in the place at which the Association is to hold its next annual meeting; and shall be required to provide suitable accommodations for the meeting, to verify and report upon the credentials of membership, to receive and announce all essays and memoirs voluntarily communicated, either by members of the Association, or by others through them, and to determine the order in which such papers are to be read and considered.

The Committee of Publication, of which the Secretaries, Treasurer, and Librarian, must constitute a part, shall have charge of preparing for the press, and of publishing and distributing such of the proceedings, transactions, and memoirs of the Association as may be ordered to be published. The six members of this Committee, who have not the immediate management of the funds, shall also in their own names as agents for the Association, hold the bond of the Treasurer for the faithful execution of his office, and shall annually audit and authenticate his accounts, and present a statement of the same in the annual report of the Committee; which report shall specify the character and cost of the publications of the Association during the year, the number of copies still at the disposal of the meeting, the funds on hand for further operations, and the probable amount of the assessment to be laid on each member of the Association for covering its annual expenditures.

VI.—FUNDS AND APPROPRIATIONS.

Funds shall be raised by the Association for meeting its current expenses and awards from year to year, but never with the view of creating a permanent income from investments. Funds may be obtained by an equal assessment of not more than five dollars annually, on each of the delegates and permanent members; by voluntary contributions for specific objects; and by the sale and disposal of publications, or of works prepared for publication.

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The funds may be appropriated for defraying the expenses of the annual meetings, including the necessary expenses of the Permanent Secretary in maintaining the necessary correspondence of the Association; for publishing the proceedings, memoirs, and transactions of the Association; for enabling the Standing Committees to fulfil their respective duties, conduct their correspondence, and procure the materials necessary for the completion of their stated annual reports; for the encouragement of scientific investigation by prizes and awards of merit; and for defraying the expenses incidental to specific investigations under the instruction of the Association, where such investigations have been accompanied with an order on the Treasurer to supply the funds necessary for carrying them into effect.

VII.—PROVISION FOR AMENDMENT.

No amendment or alteration shall be made in any of these articles, except at the annual meeting next subsequent to that at which such amendment or alteration may have been proposed; and then only by the voice of three-fourths of all the delegates in attendance.

Provided, however, that when an amendment is properly under consideration, and an amendment is offered thereto, germain to the subject, it shall be in order, and if adopted, shall have the same standing and force as if proposed at the preceding meeting of the Association.

And, in acknowledgment of having adopted the foregoing propositions, and of our willingness to abide by them, and use our endeavors to carry into effect the objects of this Association as above set forth, we have hereunto affixed our names.

NAMES OF MEMBERS.	RESIDENCE.	INSTITUTION REPRESENTED.

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BY-LAWS.

I.—ORDER OF BUSINESS.

The order of business at the annual meetings of the American Medical Association shall at all times be subject to the vote of three-fourths of all the members in attendance; and, until permanently altered, except when for a time suspended, it shall be as follows, viz:—

1st. The calling of the meeting to order by the President elected the preceding year, or, in his absence, by one of the Vice-Presidents.

2d. The report of the Committee of Arrangements on the credentials of members, after the latter have registered their names and addresses, and the titles of the institutions which they represent.

3d. The reception of members by invitation.

4th. The election of permanent members.

5th. The reading of notes from absentees.

6th. The hearing of the annual address of the President.

7th. The reception of the reports of all special committees and voluntary communications, and their reference to the appropriate Sections.

8th. The appointment of the committee of one from each State represented, to nominate officers of the Association, and to fill the standing committees.

9th. The reading and consideration of the reports of the Standing Committees of Publication; on Medical Education; on Medical Literature; and on Prize Essays.

10th. Resolutions introducing new business, and instructions to the permanent committees.

11th. The selection of the next place of meeting.

12th. The report of the Nominating Committee, and the election of officers of the Association.

13th. Reports from the several Sections.

14th. Reading of the minutes by the Secretary.

15th. Unfinished and miscellaneous business.

16th. Adjournment.

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II.—SECTIONS.

The general meetings of the Association shall be restricted to the morning sessions; and the afternoon sessions, commencing at three o'clock, shall be devoted to the hearing of reports and papers and their consideration, in the following *Sections*:—

1. Chemistry and Materia Medica.
2. Practical Medicine and Obstetrics.
3. Surgery and Anatomy.
4. Meteorology, Medical Topography, and Epidemic Diseases.
5. Medical Jurisprudence, Hygiene, and Physiology.
6. Psychology.

The chairman and secretary of the several sections shall, like other officers of the Association, be nominated by the special committee of one member from each state represented at the meeting, and elected by a vote on a general ticket. They shall hold their office until the close of the proper business of the annual meeting next succeeding their election, and until their successors are appointed.

Papers appropriate to the several sections, in order to secure consideration and action, must be sent to the Secretary of the appropriate section at least one month before the meeting which is to act upon them. It shall be the duty of the Secretary to whom such papers are sent, to examine them with care, and, with the advice of the Chairman of his Section, to determine the time and order of their presentation, and give due notice of the same; and, after their full examination and discussion by the Section, they shall be sent to the Permanent Secretary of the Association.

All papers presented directly to the Association, and other matters, may, at the discretion of the Association, be referred to the various sections for their consideration and report.

III.—STANDING COMMITTEES.

The following are the Standing Committees of the Association, to be filled by the Committee on Nominations, and to report at the next annual meeting subsequent to their appointment, viz: Committee of Arrangements; Committee of Publication; Committee on Prize Essays; Committee on Medical Education; Committee on Medical Literature; Committee on Climatology and Epidemic Diseases; and Committee on American Medical Necrology.

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The *Committee of Publication* shall append to each volume of the *Transactions* hereafter published, a copy of the Constitution, By-Laws, and Code of Ethics of the Association. It shall print conspicuously, at the beginning of each volume of the *Transactions*, the following disclaimer, viz: The American Medical Association, although formally accepting and publishing the reports of the various standing committees, holds itself wholly irresponsible for the opinions, theories, or criticisms therein contained, except when otherwise decided by special resolution.

The *Committee on Prize Essays* shall consist of five members, residing in the same neighborhood, whose duty it shall be, in the interval between the present and the next succeeding annual sessions, to receive original papers upon any medical subject, from any persons who may choose to send them; to decide upon the merits of these papers, and to select for presentation to the Association, at its next session, such as they may deem worthy of being thus presented. The Committee shall have power to form such regulations as to the mode in which the papers are to be presented, and as to the observing of secrecy, as they may think proper; and also to award two prizes of one hundred dollars each, to the best two original communications reported on favorably by them, and directed by the Association to be published.

The *Committees on Medical Education* and *Medical Literature* shall consist of five members each, to be appointed annually.

The *Committee on Climatology* and *Epidemic Diseases* shall consist of one member for each State and Territory represented in the Association, whose duty it shall be to report upon its medical topography, epidemic diseases, and the most successful treatment thereof, and the same shall continue to hold their office for three years.

The *Committee on American Medical Necrology* shall consist of one member for each State and Territory represented in the Association, whose duty it shall be to procure memorials of the eminent and worthy dead among the distinguished physicians of their respective States and Territories, and transmit them to the chairman of this committee on or before the first of April of each and every year.

IV.—THE PUBLICATION OF PAPERS AND REPORTS.

No report or other paper shall be entitled to publication in the volume for the year in which it shall be presented to the Association,

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unless it be placed in the hands of the Committee of Publication on or before the first day of July. It must also be so prepared as to require no material alteration or addition at the hands of its author.

Authors of papers are required to return their proofs within two weeks after their reception; otherwise they will be passed over and omitted from the volume.

Every paper received by this Association and ordered to be published, and all plates or other means of illustration, shall be considered the exclusive property of the Association, and shall be published and sold for the exclusive benefit of the Association.

V.—ASSESSMENTS.

The sum of five dollars shall be assessed, annually, upon each delegate to the sessions of the Association, as well as upon each of its permanent members, whether attending or not, for the purpose of raising a fund to defray necessary expenses. The payment of this sum shall be required of the delegates and members in attendance upon the sessions of the Association previously to their taking their seats and participating in the business of the sessions. Permanent members, not in attendance, shall transmit their dues to the Treasurer.

Any permanent member who shall fail to pay his annual dues for three successive years, unless absent from the country, shall be dropped from the roll of permanent members, after having been notified by the Secretary of the forfeiture of his membership.

VI.—DELEGATES FROM THE MEDICAL STAFFS OF THE ARMY AND NAVY.

Delegates representing the medical staffs of the United States Army and Navy, shall be appointed by the Chiefs of the Army and Navy Medical Bureaus. The number of delegates so appointed shall be four from the army medical officers, and an equal number from the navy medical officers.

VII.—DELEGATES TO FOREIGN MEDICAL SOCIETIES.

The President shall be authorized annually to appoint delegates to represent this Association at the meetings of the British Medical Association, the American Medical Society at Paris, and such other scientific bodies in Europe or other foreign countries as may be affiliated with us.

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VIII.—DUTIES OF MEMBERS.

No one shall be permitted to address the Association, except he shall have first given his name and residence, which shall be distinctly announced from the chair, and the member may be required to go forward and speak from the stand, but not more than ten minutes at one time.

No one appointed on a special committee, who fails to report at the meeting next succeeding the one at which he is appointed, shall be continued on such committee, or appointed on any other, unless a satisfactory excuse is offered.

It shall be the duty of every member of this Association, who learns that any existing medical school departs from the published conditions of graduation, to report the fact at the annual meetings; and, on proof of the fact, such school shall be deprived of its representation in this body.

IX.—CONDITION EXCLUDING REPRESENTATION.

No State or Local Medical Society, or other organized institution, shall be entitled to representation in this Association that has not adopted its Code of Ethics; or that has intentionally violated or disregarded any article or clause of the same.

This Association recognizes as a "regular organized" medical college, one that has been represented at any meeting, and that complies with the rules and directions found in the published *Transactions*, vol. xiii. page 33.

X.—OF THE PREVIOUS QUESTION.

When the previous question is demanded, it shall take at least twenty members to second it; and when the main question is put under force of the previous question and negatived, the question shall remain under consideration the same as if the previous question had not been enforced.

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ORDINANCES.

Resolved, That the several Sections of this Association be requested, in the future, to refer no papers or reports to the Committee of Publication, except such as can be fairly classed under one of the three following heads, viz: 1st. Such as may contain and establish *positively* new facts, modes of practice, or principles of real value. 2d. Such as may contain the results of well-devised original experimental researches. 3d. Such as present so complete a review of the facts on any particular subject as to enable the writer to deduce therefrom legitimate conclusions of importance.

Resolved, That the several sections be requested, in the future, to refer all such papers as may be presented to them for examination by this Association, that contain matter of more or less value, and yet cannot be fairly ranked under either of the heads mentioned in the foregoing resolution, back to their authors with the recommendation that they be published in such regular medical periodicals as said authors may select, with the privilege of placing at the head of such papers, "Read to the Section of the American Medical Association on the day of 18 ." (Vide *Transactions*, vol. xvi. p. 40.)

Resolved, That the Association shall send annually a delegate to the "Association of Medical Superintendents of Insane Asylums," one of whose duties it shall be to urge upon that Association the advantage, for all purposes of science, of a more intimate union with this Association. (Vide *Transactions*, vol. xvi. p. 41.)

Resolved, That, instead of yearly reprinting the list of members of the American Medical Association, the Committee of Publication be instructed to prepare and print in the *Transactions* an alphabetical catalogue triennially, containing a complete list of the Permanent Members, with their names in full, designating their residences, the year of their admission, the offices they may have held in the Association, and, in case of death or rejection, the date thereof. (Vide *Transactions*, vol. xvii. p. 33.)

Resolved, That no report or other paper shall be presented to this Association unless it be so prepared that it can be put at once into the hands of the Permanent Secretary, to be transmitted to the Committee of Publication. (Vide *Transactions*, vol. xvii. p. 27.)

Resolved, That the next Annual Meeting of the American Medi-

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cal Association shall be held in the City of Washington, on the first Tuesday in May, 1868, and every second year thereafter, until otherwise ordered by the Association.

Resolved, That whenever the Association shall meet in the City of Washington, as directed by the above resolution, the Committee of Arrangements be strictly forbidden either to provide themselves, or accept provision by others, of any entertainment or excursion whatever, which will conflict with the regular business of the body or its Sections. (Vide *Transactions*, vol. xviii. p. 35.)

Resolved, That the Permanent Secretary hereafter and from this date be authorized to draw a warrant upon the Treasurer for the expenses incurred in his attendance upon each session of the Association, and that the Treasurer is hereby instructed to pay the same. (Vide *Transactions*, vol. xviii. p. 42.)

Resolved, That the faculties of the several medical colleges of the United States be recommended to announce explicitly in their annual commencement circulars and advertisements that they will not receive certificates of time of study from irregular practitioners, and that they will not confer the degree upon any one who may acknowledge his intention to practise in accordance with any exclusive system. (Vide *Transactions*, vol. xix. p. 31.)

Resolved, That there be added to the Committee of Arrangements a Sub-Committee of Arrangements in each of our large cities, consisting of three members, whose duty it shall be to obtain, if practicable, a reduction of fare upon the routes of travel for the delegates from their city and vicinity who attend the meeting of the Association.

On motion, the Permanent Secretary was empowered to make the appointments on said committees. (Vide *Transactions*, vol. xix. p. 39.)

Resolved, That a standing committee of one be appointed upon the whole subject of vaccination, to report from time to time on such topics connected with it as shall, in the estimation of said committee, appear of chief practical interest and importance to the profession. (Vide *Transactions*, vol. xix. p. 40.)

Resolved, That those gentlemen who desire to report on special subjects, and will pledge themselves to report at the next meeting, be requested to send their names, and the subjects on which they desire to report, to the Permanent Secretary. (Vide *Transactions*, vol. xix. p. 42.)

Resolved, That hereafter the necessary expenses for rent of hall

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for general meetings and rooms for sections to accommodate the annual meetings, and the necessary expenses for cards of membership, be paid out of the treasury of the Association. (Vide *Transactions*, vol. xix. p. 42.)

Resolved, That each State Medical Society be requested to prepare an annual register of all the regular practitioners of medicine in their respective States, giving the names of the colleges in which they may have graduated, and date of diploma or license. (Vide *Transactions*, vol. xx. p. 20.)

Resolved, That this Association recognizes specialties as proper and legitimate fields of practice.

Resolved, That specialists shall be governed by the same rules of professional etiquette as have been laid down for general practitioners.

Resolved, That it shall not be proper for specialists publicly to advertise themselves such, or to assume any title not specially granted by a regularly chartered college.

Resolved, That private hand-bills addressed to members of the medical profession, or by cards in medical journals, calling the attention of professional brethren to themselves as specialists, be declared in violation of the Code of Ethics of the American Medical Association. (Vide *Transactions*, vol. xx. p. 28.)

Resolved, That a Committee of one be appointed, residing at Washington, to render the Librarian of Congress such assistance as the interests of the Association may require. (Vide *Transactions*, vol. xx. p. 29.)

Whereas, The proper construction of Art. IV. Sec. 1, Code of Ethics, A. M. A., having been called for, relative to consultation with irregular practitioners who are graduates of regular schools,

Resolved, That said Art. IV. Sect. 1, Code of Ethics, excludes all such practitioners from recognition by the regular profession. (Vide *Transactions*, vol. xx. p. 30.)

Whereas, The contract system is contrary to medical ethics:

Resolved, That all contract physicians, as well as those guilty of bidding for practice at less rates than those established by a majority of regular graduates of the same locality, be classed as irregular practitioners. (Vide *Transactions*, vol. xx. p. 41.)

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CODE OF ETHICS

OF THE

AMERICAN MEDICAL ASSOCIATION,

ADOPTED MAY, 1847.

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CODE OF MEDICAL ETHICS.

OF THE DUTIES OF PHYSICIANS TO THEIR PATIENTS, AND OF THE OBLIGATIONS OF PATIENTS TO THEIR PHYSICIANS.

ART. I.—*Duties of physicians to their patients.*

§ 1. A physician should not only be ever ready to obey the calls of the sick, but his mind ought also to be imbued with the greatness of his mission, and the responsibility he habitually incurs in its discharge. These obligations are the more deep and enduring, because there is no tribunal other than his own conscience to adjudge penalties for carelessness or neglect. Physicians should, therefore, minister to the sick with due impressions of the importance of their office; reflecting that the ease, the health, and the lives of those committed to their charge, depend on their skill, attention, and fidelity. They should study, also, in their deportment, so to unite *tenderness* with *firmness*, and *condescension* with *authority*, as to inspire the minds of their patients with gratitude, respect, and confidence.

§ 2. Every case committed to the charge of a physician should be treated with attention, steadiness, and humanity. Reasonable indulgence should be granted to the mental imbecility and caprices of the sick. Secrecy and delicacy, when required by peculiar circumstances, should be strictly observed; and the familiar and confidential intercourse to which physicians are admitted in their professional visits, should be used with discretion, and with the most scrupulous regard to fidelity and honor. The obligation of secrecy extends beyond the period of professional services;—none of the privacies of personal and domestic life, no infirmity of disposition or flaw of character observed during professional attendance should ever be divulged by the physician except when he is imperatively required to do so. The force and necessity of this

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obligation are indeed so great, that professional men have, under certain circumstances, been protected in their observance of secrecy by courts of justice.

§ 3. Frequent visits to the sick are in general requisite, since they enable the physician to arrive at a more perfect knowledge of the disease—to meet promptly every change which may occur, and also tend to preserve the confidence of the patient. But unnecessary visits are to be avoided, as they give useless anxiety to the patient, tend to diminish the authority of the physician, and render him liable to be suspected of interested motives.

§ 4. A physician should not be forward to make gloomy prognostications, because they savor of empiricism, by magnifying the importance of his services in the treatment or cure of the disease. But he should not fail, on proper occasions, to give to the friends of the patient timely notice of danger when it really occurs; and even to the patient himself, if absolutely necessary. This office, however, is so peculiarly alarming when executed by him, that it ought to be declined whenever it can be assigned to any other person of sufficient judgment and delicacy. For, the physician should be the minister of hope and comfort to the sick; that, by such cordials to the drooping spirit, he may smooth the bed of death, revive expiring life, and counteract the depressing influence of those maladies which often disturb the tranquillity of the most resigned in their last moments. The life of a sick person can be shortened not only by the acts, but also by the words or the manner of a physician. It is, therefore, a sacred duty to guard himself carefully in this respect, and to avoid all things which have a tendency to discourage the patient and to depress his spirits.

§ 5. A physician ought not to abandon a patient because the case is deemed incurable; for his attendance may continue to be highly useful to the patient, and comforting to the relatives around him, even in the last period of a fatal malady, by alleviating pain and other symptoms, and by soothing mental anguish. To decline attendance, under such circumstances, would be sacrificing to fanciful delicacy and mistaken liberality, that moral duty, which is independent of, and far superior to, all pecuniary consideration.

§ 6. Consultations should be promoted in difficult or protracted cases, as they give rise to confidence, energy, and more enlarged views in practice.

§ 7. The opportunity which a physician not unfrequently enjoys of promoting and strengthening the good resolutions of his patients, suffering under the consequences of vicious conduct, ought never

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to be neglected. His counsels, or even remonstrances, will give satisfaction, not offence, if they be proffered with politeness, and evince a genuine love of virtue, accompanied by a sincere interest in the welfare of the person to whom they are addressed.

ART. II.—*Obligations of patients to their physicians.*

§ 1. The members of the medical profession, upon whom is enjoined the performance of so many important and arduous duties towards the community, and who are required to make so many sacrifices of comfort, ease, and health, for the welfare of those who avail themselves of their services, certainly have a right to expect and require, that their patients should entertain a just sense of the duties which they owe to their medical attendants.

§ 2. The first duty of a patient is to select as his medical adviser one who has received a regular professional education. In no trade or occupation, do mankind rely on the skill of an untaught artist; and in medicine, confessedly the most difficult and intricate of the sciences, the world ought not to suppose that knowledge is intuitive.

§ 3. Patients should prefer a physician whose habits of life are regular, and who is not devoted to company, pleasure, or to any pursuit incompatible with his professional obligations. A patient should, also, confide the care of himself and family, as much as possible, to one physician; for a medical man who has become acquainted with the peculiarities of constitution, habits, and predispositions of those he attends, is more likely to be successful in his treatment than one who does not possess that knowledge.

A patient who has thus selected his physician, should always apply for advice in what may appear to him trivial cases, for the most fatal results often supervene on the slightest accidents. It is of still more importance that he should apply for assistance in the forming stage of violent diseases; it is to a neglect of this precept that medicine owes much of the uncertainty and imperfection with which it has been reproached.

§ 4. Patients should faithfully and unreservedly communicate to their physician the supposed cause of their disease. This is the more important, as many diseases of a mental origin simulate those depending on external causes, and yet are only to be cured by ministering to the mind diseased. A patient should never be afraid of thus making his physician his friend and adviser; he

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should always bear in mind that a medical man is under the strongest obligations of secrecy. Even the female sex should never allow feelings of shame or delicacy to prevent their disclosing the seat, symptoms, and causes of complaints peculiar to them. However commendable a modest reserve may be in the common occurrences of life, its strict observance in medicine is often attended with the most serious consequences, and a patient may sink under a painful and loathsome disease, which might have been readily prevented had timely intimation been given to the physician.

§ 5. A patient should never weary his physician with a tedious detail of events or matters not appertaining to his disease. Even as relates to his actual symptoms, he will convey much more real information by giving clear answers to interrogatories, than by the most minute account of his own framing. Neither should he obtrude upon his physician the details of his business nor the history of his family concerns.

§ 6. The obedience of a patient to the prescriptions of his physician should be prompt and implicit. He should never permit his own crude opinions as to their fitness to influence his attention to them. A failure in one particular may render an otherwise judicious treatment dangerous, and even fatal. This remark is equally applicable to diet, drink, and exercise. As patients become convalescent, they are very apt to suppose that the rules prescribed for them may be disregarded, and the consequence, but too often, is a relapse. Patients should never allow themselves to be persuaded to take any medicine whatever, that may be recommended to them by the self-constituted doctors and doctresses who are so frequently met with, and who pretend to possess infallible remedies for the cure of every disease. However simple some of their prescriptions may appear to be, it often happens that they are productive of much mischief, and in all cases they are injurious, by contravening the plan of treatment adopted by the physician.

§ 7. A patient should, if possible, avoid even the *friendly visits of a physician* who is not attending him—and when he does receive them, he should never converse on the subject of his disease, as an observation may be made, without any intention of interference, which may destroy his confidence in the course he is pursuing, and induce him to neglect the directions prescribed to him. A patient should never send for a consulting physician without the express consent of his own medical attendant. It is of great importance that physicians should act in concert; for, although their modes

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of treatment may be attended with equal success when employed singly, yet conjointly they are very likely to be productive of disastrous results.

§ 8. When a patient wishes to dismiss his physician, justice and common courtesy require that he should declare his reasons for so doing.

§ 9. Patients should always, when practicable, send for their physician in the morning, before his usual hour of going out; for, by being early aware of the visits he has to pay during the day, the physician is able to apportion his time in such a manner as to prevent an interference of engagements. Patients should also avoid calling on their medical adviser unnecessarily during the hours devoted to meals or sleep. They should always be in readiness to receive the visits of their physician, as the detention of a few minutes is often of serious inconvenience to him.

§ 10. A patient should, after his recovery, entertain a just and enduring sense of the value of the services rendered him by his physician; for these are of such a character, that no mere pecuniary acknowledgment can repay or cancel them.

OF THE DUTIES OF PHYSICIANS TO EACH OTHER, AND TO THE PROFESSION AT LARGE.

ART. I.—*Duties for the support of professional character.*

§ 1. Every individual, on entering the profession, as he becomes thereby entitled to all its privileges and immunities, incurs an obligation to exert his best abilities to maintain its dignity and honor, to exalt its standing, and to extend the bounds of its usefulness. He should, therefore, observe strictly such laws as are instituted for the government of its members;—should avoid all contumelious and sarcastic remarks relative to the faculty as a body; and while, by unwearied diligence, he resorts to every honorable means of enriching the science, he should entertain a due respect for his seniors, who have, by their labors, brought it to the elevated condition in which he finds it.

§ 2. There is no profession, from the members of which greater purity of character, and a higher standard of moral excellence are required, than the medical; and to attain such eminence, is a duty every physician owes alike to his profession and to his patients. It is due to the latter, as without it he cannot command their respect and confidence, and to both, because no scientific attainments can

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compensate for the want of correct moral principles. It is also incumbent upon the faculty to be temperate in all things, for the practice of physic requires the unremitting exercise of a clear and vigorous understanding; and, on emergencies, for which no professional man should be unprepared, a steady hand, an acute eye, and an unclouded head may be essential to the well-being, and even to the life, of a fellow-creature.

§ 3. It is derogatory to the dignity of the profession to resort to public advertisements, or private cards, or handbills, inviting the attention of individuals affected with particular diseases—publicly offering advice and medicine to the poor gratis, or promising radical cures; or to publish cases and operations in the daily prints, or suffer such publications to be made; to invite laymen to be present at operations, to boast of cures and remedies, to adduce certificates of skill and success, or to perform any other similar acts. These are the ordinary practices of empirics, and are highly reprehensible in a regular physician.

§ 4. Equally derogatory to professional character is it for a physician to hold a patent for any surgical instrument or medicine; or to dispense a secret *nostrum*, whether it be the composition or exclusive property of himself or of others. For, if such nostrum be of real efficacy, any concealment regarding it is inconsistent with beneficence and professional liberality; and if mystery alone give it value and importance, such craft implies either disgraceful ignorance or fraudulent avarice. It is also reprehensible for physicians to give certificates attesting the efficacy of patent or secret medicines, or in any way to promote the use of them.

ART. II.—*Professional services of physicians to each other.*

§ 1. All practitioners of medicine, their wives, and their children while under the paternal care, are entitled to the gratuitous services of any one or more of the faculty residing near them, whose assistance may be desired. A physician afflicted with disease is usually an incompetent judge of his own case; and the natural anxiety and solicitude which he experiences at the sickness of a wife, a child, or any one who, by the ties of consanguinity, is rendered peculiarly dear to him, tend to obscure his judgment, and produce timidity and irresolution in his practice. Under such circumstances, medical men are peculiarly dependent upon each other, and kind offices and professional aid should always be cheerfully

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and gratuitously afforded. Visits ought not, however, to be obtruded officiously; as such unasked civility may give rise to embarrassment, or interfere with that choice on which confidence depends. But, if a distant member of the faculty, whose circumstances are affluent, request attendance, and an honorarium be offered, it should not be declined; for no pecuniary obligation ought to be imposed, which the party receiving it would wish not to incur.

ART. III.—*Of the duties of physicians as respects vicarious offices.*

§ 1. The affairs of life, the pursuit of health, and the various accidents and contingencies to which a medical man is peculiarly exposed, sometimes require him temporarily to withdraw from his duties to his patients, and to request some of his professional brethren to officiate for him. Compliance with this request is an act of courtesy, which should always be performed with the utmost consideration for the interest and character of the family physician, and when exercised for a short period, all the pecuniary obligations for such service should be awarded to him. But if a member of the profession neglect his business in quest of pleasure and amusement, he cannot be considered as entitled to the advantages of the frequent and long-continued exercise of this fraternal courtesy, without awarding to the physician who officiates, the fees arising from the discharge of his professional duties.

In obstetrical and important surgical cases, which give rise to unusual fatigue, anxiety, and responsibility, it is just that the fees accruing therefrom should be awarded to the physician who officiates.

ART. IV.—*Of the duties of physicians in regard to consultations.*

§ 1. A regular medical education furnishes the only presumptive evidence of professional abilities and acquirements, and ought to be the only acknowledged right of an individual to the exercise and honors of his profession. Nevertheless, as in consultations the good of the patient is the sole object in view, and this is often dependent on personal confidence, no intelligent regular practitioner, who has a license to practise from some medical board of known and acknowledged respectability, recognized by this Association, and who is in good moral and professional standing in the place in which he resides, should be fastidiously excluded from fellow-

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ship, or his aid refused in consultation, when it is requested by the patient. But no one can be considered as a regular practitioner or a fit associate in consultation, whose practice is based on an exclusive dogma, to the rejection of the accumulated experience of the profession, and of the aids actually furnished by anatomy, physiology, pathology, and organic chemistry.

§ 2. In consultations, no rivalship or jealousy should be indulged; candor, probity, and all due respect should be exercised towards the physician having charge of the case.

§ 3. In consultations, the attending physician should be the first to propose the necessary questions to the sick; after which the consulting physician should have the opportunity to make such further inquiries of the patient as may be necessary to satisfy him of the true character of the case. Both physicians should then retire to a private place for deliberation; and the one first in attendance should communicate the directions agreed upon to the patient or his friends, as well as any opinions which it may be thought proper to express. But no statement or discussion of it should take place before the patient or his friends, except in the presence of all the faculty attending, and by their common consent; and no *opinions* or *prognostications* should be delivered which are not the result of previous deliberation and concurrence.

§ 4. In consultations, the physician in attendance should deliver his opinion first; and when there are several consulting, they should deliver their opinions in the order in which they have been called in. No decision, however, should restrain the attending physician from making such variations in the mode of treatment, as any subsequent unexpected change in the character of the case may demand. But such variation, and the reasons for it, ought to be carefully detailed at the next meeting in consultation. The same privilege belongs also to the consulting physician if he is sent for in an emergency, when the regular attendant is out of the way, and similar explanations must be made by him at the next consultation.

§ 5. The utmost punctuality should be observed in the visits of physicians when they are to hold consultation together, and this is generally practicable, for society has been considerate enough to allow the plea of a professional engagement to take precedence of all others, and to be an ample reason for the relinquishment of any present occupation. But, as professional engagements may sometimes interfere, and delay one of the parties, the physician who first arrives should wait for his associate a reasonable period, after

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which the consultation should be considered as postponed to a new appointment. If it be the attending physician who is present, he will of course see the patient and prescribe; but if it be the consulting one, he should retire, except in case of emergency, or when he has been called from a considerable distance, in which latter case he may examine the patient, and give his opinion in *writing*, and *under seal*, to be delivered to his associate.

§ 6. In consultations, theoretical discussions should be avoided, as occasioning perplexity and loss of time. For there may be much diversity of opinion concerning speculative points, with perfect agreement in those modes of practice which are founded, not on hypothesis, but on experience and observation.

§ 7. All discussions in consultation should be held as secret and confidential. Neither by words nor manner should any of the parties to a consultation assert or insinuate that any part of the treatment pursued did not receive his assent. The responsibility must be equally divided between the medical attendants—they must equally share the credit of success as well as the blame of failure.

§ 8. Should an irreconcilable diversity of opinion occur when several physicians are called upon to consult together, the opinion of the majority should be considered as decisive; but if the numbers be equal on each side, then the decision should rest with the attending physician. It may, moreover, sometimes happen, that two physicians cannot agree in their views of the nature of a case, and the treatment to be pursued. This is a circumstance much to be deplored, and should always be avoided, if possible, by mutual concessions, as far as they can be justified by a conscientious regard for the dictates of judgment. But in the event of its occurrence, a third physician should, if practicable, be called to act as umpire; and, if circumstances prevent the adoption of this course, it must be left to the patient to select the physician in whom he is most willing to confide. But, as every physician relies upon the rectitude of his judgment, he should, when left in the minority, politely and consistently retire from any further deliberation in the consultation, or participation in the management of the case.

§ 9. As circumstances sometimes occur to render a *special consultation* desirable, when the continued attendance of two physicians might be objectionable to the patient, the member of the faculty whose assistance is required in such cases, should sedulously guard against all future unsolicited attendance. As such consultations

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require an extraordinary portion both of time and attention, at least a double honorarium may be reasonably expected.

§ 10. A physician who is called upon to consult, should observe the most honorable and scrupulous regard for the character and standing of the practitioner in attendance; the practice of the latter, if necessary, should be justified as far as it can be, consistently with a conscientious regard for truth, and no hint or insinuation should be thrown out which could impair the confidence reposed in him, or affect his reputation. The consulting physician should also carefully refrain from any of those extraordinary attentions or assiduities, which are too often practised by the dishonest for the base purpose of gaining applause, or ingratiating themselves into the favor of families and individuals.

ART. V.—*Duties of physicians in cases of interference.*

§ 1. Medicine is a liberal profession, and those admitted into its ranks should found their expectations of practice upon the extent of their qualifications, not on intrigue or artifice.

§ 2. A physician in his intercourse with a patient under the care of another practitioner, should observe the strictest caution and reserve. No meddling inquiries should be made—no disingenuous hints given relative to the nature and treatment of his disorder; nor any course of conduct pursued that may directly or indirectly tend to diminish the trust reposed in the physician employed.

§ 3. The same circumspection and reserve should be observed when, from motives of business or friendship, a physician is prompted to visit an individual who is under the direction of another practitioner. Indeed, such visits should be avoided, except under peculiar circumstances; and when they are made, no particular inquiries should be instituted relative to the nature of the disease, or the remedies employed, but the topics of conversation should be as foreign to the case as circumstances will admit.

§ 4. A physician ought not to take charge of or prescribe for a patient who has recently been under the care of another member of the faculty in the same illness, except in cases of sudden emergency, or in consultation with the physician previously in attendance, or when the latter has relinquished the case, or been regularly notified that his services are no longer desired. Under such circumstances no unjust and illiberal insinuations should be thrown out in relation to the conduct or practice previously pursued, which should

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be justified as far as candor and regard for truth and probity will permit; for it often happens that patients become dissatisfied when they do not experience immediate relief, and, as many diseases are naturally protracted, the want of success, in the first stage of treatment, affords no evidence of a lack of professional knowledge and skill.

§ 5. When a physician is called to an urgent case, because the family attendant is not at hand, he ought, unless his assistance in consultation be desired, to resign the care of the patient to the latter immediately on his arrival.

§ 6. It often happens in cases of sudden illness, or of recent accidents and injuries, owing to the alarm and anxiety of friends, that a number of physicians are simultaneously sent for. Under these circumstances, courtesy should assign the patient to the first who arrives, who should select from those present any additional assistance that he may deem necessary. In all such cases, however, the practitioner who officiates should request the family physician, if there be one, to be called, and, unless his further attendance be requested, should resign the case to the latter on his arrival.

§ 7. When a physician is called to the patient of another practitioner, in consequence of the sickness or absence of the latter, he ought, on the return or recovery of the regular attendant, and with the consent of the patient, to surrender the case.

[The expression, "patient of another practitioner," is understood to mean a patient who may have been under the charge of another practitioner at the time of the attack of sickness, or departure from home of the latter, or who may have called for his attendance during his absence or sickness, or in any other manner given it to be understood that he regarded the said physician as his regular medical attendant.]

§ 8. A physician, when visiting a sick person in the country, may be desired to see a neighboring patient who is under the regular direction of another physician, in consequence of some sudden change or aggravation of symptoms. The conduct to be pursued on such an occasion is to give advice adapted to present circumstances; to interfere no further than is absolutely necessary with the general plan of treatment; to assume no future direction, unless it be expressly desired; and, in this last case, to request an immediate consultation with the practitioner previously employed.

§ 9. A wealthy physician should not give advice *gratis* to the affluent; because his doing so is an injury to his professional bre-

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thren. The office of a physician can never be supported as an exclusively beneficent one; and it is defrauding, in some degree, the common funds for its support, when fees are dispensed with which might justly be claimed.

§ 10. When a physician who has been engaged to attend a case of midwifery is absent, and another is sent for, if delivery is accomplished during the attendance of the latter, he is entitled to the fee, but should resign the patient to the practitioner first engaged.

ART. VI.—*Of differences between physicians.*

§ 1. Diversity of opinion and opposition of interest, may, in the medical as in other professions, sometimes occasion controversy and even contention. Whenever such cases unfortunately occur, and cannot be immediately terminated, they should be referred to the arbitration of a sufficient number of physicians or a *court-medical.*

§ 2. As peculiar reserve must be maintained by physicians towards the public, in regard to professional matters, and as there exist numerous points in medical ethics and etiquette through which the feelings of medical men may be painfully assailed in their intercourse with each other, and which cannot be understood or appreciated by general society, neither the subject-matter of such differences nor the adjudication of the arbitrators should be made public, as publicity in a case of this nature may be personally injurious to the individuals concerned, and can hardly fail to bring discredit on the faculty.

ART. VII.—*Of pecuniary acknowledgments.*

Some general rules should be adopted by the faculty, in every town or district, relative to *pecuniary acknowledgments* from their patients; and it should be deemed a point of honor to adhere to these rules with as much uniformity as varying circumstances will admit.

OF THE DUTIES OF THE PROFESSION TO THE PUBLIC, AND OF THE OBLIGATIONS OF THE PUBLIC TO THE PROFESSION.

ART. I.—*Duties of the profession to the public.*

§ 1. As good citizens, it is the duty of physicians to be ever vigilant for the welfare of the community, and to bear their part in sustaining its institutions and burdens; they should also be ever

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ready to give counsel to the public in relation to matters especially appertaining to their profession, as on subjects of medical police, public hygiene, and legal medicine. It is their province to enlighten the public in regard to quarantine regulations—the location, arrangement, and dietaries of hospitals, asylums, schools, prisons, and similar institutions—in relation to the medical police of towns, as drainage, ventilation, etc.—and in regard to measures for the prevention of epidemic and contagious diseases; and when pestilence prevails, it is their duty to face the danger, and to continue their labors for the alleviation of the suffering, even at the jeopardy of their own lives.

§ 2. Medical men should also be always ready, when called on by the legally constituted authorities, to enlighten coroners' inquests and courts of justice, on subjects strictly medical—such as involve questions relating to sanity, legitimacy, murder by poisons or other violent means, and in regard to the various other subjects embraced in the science of Medical Jurisprudence. But in these cases, and especially where they are required to make a *post-mortem* examination, it is just, in consequence of the time, labor, and skill required, and the responsibility and risk they incur, that the public should award them a proper honorarium.

§ 3. There is no profession by the members of which eleemosynary services are more liberally dispensed than the medical, but justice requires that some limits should be placed to the performance of such good offices. Poverty, professional brotherhood, and certain of the public duties referred to in the first section of this article, should always be recognized as presenting valid claims for gratuitous services; but neither institutions endowed by the public or by rich individuals, societies for mutual benefit, for the insurance of lives or for analogous purposes, nor any profession or occupation, can be admitted to possess such privilege. Nor can it be justly expected of physicians to furnish certificates of inability to serve on juries, to perform militia duty, or to testify to the state of health of persons wishing to insure their lives, obtain pensions, or the like, without a pecuniary acknowledgment. But to individuals in indigent circumstances, such professional services should always be cheerfully and freely accorded.

§ 4. It is the duty of physicians, who are frequent witnesses of the enormities committed by quackery, and the injury to health and even destruction of life caused by the use of quack medicines, to enlighten the public on these subjects, to expose the injuries

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sustained by the unwary from the devices and pretensions of artful empirics and impostors. Physicians ought to use all the influence which they may possess, as professors in Colleges of Pharmacy, and by exercising their option in regard to the shops to which their prescriptions shall be sent, to discourage druggists and apothecaries from vending quack or secret medicines, or from being in any way engaged in their manufacture and sale.

ART. II.—*Obligations of the public to physicians.*

§ 1. The benefits accruing to the public, directly and indirectly, from the active and unwearied beneficence of the profession, are so numerous and important, that physicians are justly entitled to the utmost consideration and respect from the community. The public ought likewise to entertain a just appreciation of medical qualifications; to make a proper discrimination between true science and the assumptions of ignorance and empiricism—to afford every encouragement and facility for the acquisition of medical education—and no longer to allow the statute-books to exhibit the anomaly of exacting knowledge from physicians, under a liability to heavy penalties, and of making them obnoxious to punishment for resorting to the only means of obtaining it.

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CATALOGUE OF THE OFFICERS

OF THE

AMERICAN MEDICAL ASSOCIATION.

PRESIDENTS AND VICE-PRESIDENTS OF THE AMERICAN MEDICAL ASSOCIATION.

1847-48.

PHILADELPHIA.

PRESIDENT.

NATHANIEL CHAPMAN, M. D., *Pennsylvania.*

VICE-PRESIDENTS.

JONATHAN KNIGHT, M.D., *Connecticut.*
ALEXANDER H. STEVENS, M.D., *New York.*
JAMES MOULTRIE, M.D., *South Carolina.*
A. H. BUCHANAN, M.D., *Tennessee.*

1848-49.

BALTIMORE.

PRESIDENT.

ALEXANDER H. STEVENS, M.D., *New York.*

VICE-PRESIDENTS.

JOHN C. WARREN, M.D., *Massachusetts.*
SAMUEL JACKSON, M.D., *Pennsylvania.*
PAUL F. EVE, M.D., *Georgia.*
W. M. AWL, M.D., *Ohio.*

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1849-50.

BOSTON.

PRESIDENT.

JOHN C. WARREN, M.D., *Massachusetts.*

VICE-PRESIDENTS.

JOHN P. HARRISON, M.D., *Ohio.*
AUSTIN FLINT, M.D., *New York.*
HUGH H. MAGUIRE, M.D., *Virginia.*
R. S. STEWART, M.D., *Maryland.*

1850-51.

CINCINNATI.

PRESIDENT.

REUBEN D. MUSSEY, M.D., *Ohio.*

VICE-PRESIDENTS.

J. B. JOHNSON, M.D., *Missouri.*
DANIEL BRAINARD, M.D., *Illinois.*
A. LOPEZ, M.D., *Alabama.*
GEORGE W. NORRIS, M.D., *Pennsylvania.*

1851-52.

CHARLESTON.

PRESIDENT.

JAMES MOULTRIE, M.D., *South Carolina.*

VICE-PRESIDENTS.

GEORGE HAYWARD, M.D., *Massachusetts.*
B. R. WELLFORD, M.D., *Virginia.*
R. D. ARNOLD, M.D., *Georgia.*
J. B. FLINT, M.D., *Kentucky.*

1852-53.

RICHMOND.

PRESIDENT.

BEVERLY R. WELLFORD, M.D., *Virginia.*

VICE-PRESIDENTS.

JONATHAN KNIGHT, M.D., *Connecticut.*
THOMAS Y. SIMONS, M.D., *South Carolina.*
JAMES W. THOMSON, M.D., *Delaware.*
C. A. POPE, M.D., *Missouri.*

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1853-54.

NEW YORK.

PRESIDENT.

JONATHAN KNIGHT, M. D., *Connecticut.*

VICE-PRESIDENTS.

USHER PARSONS, M. D., *Rhode Island.*
LEWIS CONDICT, M. D., *New Jersey.*
HENRY R. FROST, M. D., *South Carolina.*
R. L. HOWARD, M. D., *Ohio.*

1854-55.

ST. LOUIS.

PRESIDENT.

CHARLES A. POPE, M. D., *Missouri.*

VICE-PRESIDENTS.

E. D. FENNER, M. D., *Louisiana.*
N. S. DAVIS, M. D., *Illinois.*
WM. WRAGG, M. D., *South Carolina.*
JOHN GREEN, M. D., *Massachusetts.*

1855-56.

PHILADELPHIA.

PRESIDENT.

GEORGE B. WOOD, M. D., *Pennsylvania.*

VICE-PRESIDENTS.

WM. M. BOLING, M. D., *Alabama.*
DANIEL TILDEN, M. D., *Ohio.*
D. HUMPHREYS STORER, M. D., *Massachusetts.*
GRAFTON TYLER, M. D., *District of Columbia.*

1856-57.

DETROIT.

PRESIDENT.

ZINA PITCHER, M. D., *Michigan.*

VICE-PRESIDENTS.

THOMAS W. BLATCHFORD, M. D., *New York.*
E. GEDDINGS, M. D., *South Carolina.*
WM. K. BOWLING, M. D., *Tennessee.*
W. H. BRISBANE, M. D., *Wisconsin.*

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1857-58.

NASHVILLE.

PRESIDENT.

PAUL F. EVE, M. D., *Tennessee.*

VICE-PRESIDENTS.

R. J. BRECKENRIDGE, M. D., *Kentucky.*
W. H. BYFORD, M. D., *Indiana.*
D. M. REESE, M. D., *New York.*
HENRY F. CAMPBELL, M. D., *Georgia.*

1858-59.

WASHINGTON.

PRESIDENT.

HARVEY LINDSLEY, M. D., *District of Columbia.*

VICE-PRESIDENTS.

W. L. SUTTON, M. D., *Kentucky.*
JOSIAH CROSBY, M. D., *New Hampshire.*
THOMAS O. EDWARDS, M, D., *Iowa.*
W. C. WARREN, M. D., *North Carolina.*

1859-60.

LOUISVILLE.

PRESIDENT.

HENRY MILLER, M. D., *Kentucky.*

VICE-PRESIDENTS.

HENRY F. ASKEW, M. D., *Delaware.*
LYNDON A. SMITH, M. D., *New Jersey.*
CHARLES S. TRIPLER, M. D., *United States Army.*
CALVIN WEST, M. D., *Indiana.*

1860-63.

NEW HAVEN.

PRESIDENT.

ELI IVES, M. D., *Connecticut.*

VICE-PRESIDENTS.

WILSON JEWELL, M. D., *Pennsylvania.*
JOSEPH A. LOGAN, M. D., *Georgia.*
A. B. PALMER, M. D., *Michigan.*
JOSEPH N. MCDOWELL, M. D., *Missouri.*

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1863-64.

CHICAGO.

PRESIDENT.

ALDEN MARCH, M. D., *New York.*

VICE-PRESIDENTS.

JAMES COUPER, M. D., *Delaware.*
DAVID PRINCE, M. D., *Illinois.*
CHRISTOPHER C. COX, M. D., *Maryland.*
EZRA S. CARR, M. D., *Wisconsin.*

1864.

NEW YORK.

PRESIDENT.

NATHAN S. DAVIS, M. D., *Illinois.*

VICE-PRESIDENTS.

W. H. MUSSEY, M. D., *Ohio.*
WORTHINGTON HOOKER, M. D., *Connecticut.*
WILLIAM WHELAN, M. D., *District of Columbia.*
F. E. B. HEINTZE, M. D., *Maryland.*

1865.

BOSTON.

The Constitution having been amended, the same officers presided also at Boston. (Vide *Transactions*, vol. xv. p. 50.)

1866.

BALTIMORE.

PRESIDENT.

D. HUMPHREYS STORER, M. D., *Massachusetts.*

VICE-PRESIDENTS.

JAMES F. HIBBERD, M. D., *Indiana.*
STEPHEN O. ALMY, M. D., *Ohio.*
THEOPHILUS C. DUNN, M. D., *Rhode Island.*
W. P. JOHNSON, M. D., *District of Columbia.*

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1867.

CINCINNATI.

PRESIDENT.

HENRY F. ASKEW, M. D., *Delaware.*

VICE-PRESIDENTS.

WILLIAM K. BOWLING, M. D., *Tennessee.*
J. C. HUGHES, M. D., *Iowa.*
H. I. BOWDITCH, M. D., *Massachusetts.*
THOMAS C. BRINSMADE, M. D., *New York.*

1868.

WASHINGTON.

PRESIDENT.

SAMUEL D. GROSS, M. D., *Pennsylvania.*

VICE-PRESIDENTS.

ALFRED C. POST, M. D., *New York.*
JOHN L. ATLEE, M. D., *Pennsylvania.*
DAVID W. YANDELL, M. D., *Kentucky.*
HORATIO ROBINSON STORER, M. D., *Massachusetts.*

1869.

NEW ORLEANS.

PRESIDENT.

WILLIAM O. BALDWIN, M. D., *Alabama.*

VICE-PRESIDENTS.

GEORGE MENDENHALL, M. D., *Ohio.*
NOBLE YOUNG, M. D., *District of Columbia.*
N. P. MONROE, M. D., *Maine.*
S. M. BEMISS, M. D., *Louisiana.*

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OFFICERS FOR 1870.

WASHINGTON.

PRESIDENT.

GEORGE MENDENHALL, M. D., *Ohio.*

VICE-PRESIDENTS.

WARREN STONE, M. D., *Louisiana.*
LOUIS A. SAYRE, M. D., *New York.*
F. GURNEY SMITH, M. D., *Pennsylvania.*
JOHN S. MOORE, M. D., *Missouri.*

PERMANENT SECRETARY.

WILLIAM B. ATKINSON, M. D., *Pennsylvania.*

ASSISTANT SECRETARY.

WM. LEE, M. D., *District of Columbia.*

TREASURER.

CASPAR WISTER, M. D., *Pennsylvania.*

LIBRARIAN.

ROBERT REYBURN, M. D., *District of Columbia.*

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PERMANENT MEMBERS.

Explanation.—P. signifies President; V.P., Vice-President; T., Treasurer; S., Secretary; L., Librarian; an obelisk [†] prefixed to a name denotes deceased. The figures at the end of each line denote the date of membership.

†Abbe, Alanson	Boston, Mass.	1860
Abbe, Edward P.	New Bedford, Mass.	1863
Abbot, Samuel L.	Boston, Mass.	1849
Abbott, James B.	Sanbornton, N. H.	1848
Abernathy, J. J.	Hockerville, Tenn.	1857
Abernathy, Robert Townes	Tuscumbia, Ala.	1869
†Adams, Hiram [d. 1865]	Fabius, N. Y.	1860
Adams, Homer	Janesville, Wis.	1860
†Adams, Horace W.	Boston, Mass.	1856
†Adams, Horatio [d. 1861]	Waltham, Mass.	1849
Adams, John G.	New York, N. Y.	1847
Adams, Nathan	Springfield, Mass.	1853
†Adams, Z. Boylston	Boston, Mass.	1847
Adgate, Luther W.	Irasburg, Vt.	1865
Adler, John M.	Philadelphia, Pa.	1856
Agard, Aurelius H.	Sandusky, Ohio,	1863
Agassiz, Louis	Cambridge, Mass.	1859
Agnew, Cornelius R.	New York, N. Y.	1860
Aigner, Godfrey	New York, N. Y.	1864
Ainsworth, F. S.	Boston, Mass.	1849
Alba, E. M.	Angelica, N. Y.	1864
Albers, Henry	Baltimore, Md.	1861
Alden, Ebenezer	Randolph, Mass.	1849
Alexander, Abm. F.	Eutaw, Ala.	1857
†Alexander, Ashton	Baltimore, Md.	1848
Alexander, John B.	Lexington, Mo.	1854
Allen, Charles	Washington, D. C.	1866
Allen, Charles L.	Rutland, Vt.	1853
Allen, Dudley	Oberlin, Ohio.	1867
Allen, Ezra P.	Athens, Pa.	1860
Allen, George T.	Springfield, Ill.	1854
†Allen, Hiram [d. 1864]	Woonsocket, R. I.	1852

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Allen, John L.	Saco, Me.	1865
Allen, J. M.	Prospect Hill, Mo.	1859
Allen, Lucius A.	Owego, N. Y.	1864
Allen, Nathan	Lowell, Mass.	1849
Allen, Peter	Kinsman, Ohio,	1859
Allen, R. L.	Saratoga Springs, N. Y.	1854
†Allen, W. H. [d. 1864]	Orono, Me.	1856
†Alley, John B. [d. 1862]	Boston, Mass.	1852
Alleyne, J. S. B.	St. Louis, Mo.	1854
Almy, Stephen Olney, V. P.	Cincinnati, Ohio.	1863
†Amerman, George K.	Chicago, Ill.	1863
Ames, J. S.	Holden, Mass.	1865
Anderson, James	New York, N. Y.	1849
Anderson, L. H.	Sumpterville, Ala.	1850
Anderson, N. B.	Louisville, Ky.	1859
Anderson, Wm.	Indiana, Pa.	1868
Anderson, W. C.	Stapleton, N. Y.	1855
Anderson, W. H.	Mobile, Ala.	1851
Andrews, E.	Chicago, Ill.	1851
Andrews, George Pierce	Detroit, Mich.	1869
Andrews, J.	Pawpaw, Mich.	1853
Andrews, Robert	Orange, Mass.	1866
Anfoux, Octavius	New Orleans, La.	1869
Antisell, Thomas	Georgetown, D. C.	1858
Appleton, John	Cambridgeport, Mass.	1867
Armitage, James	Baltimore, Md.	1848
Armor, Samuel G.	Detroit, Mich.	1850
Armsby, James H.	Albany, N. Y.	1853
Armstrong, E. W.	Rochester, N. Y.	1855
Arnold, Abraham B.	Baltimore, Md.	1868
Arnold, E. S. F.	Yonkers, N. Y.	1863
Arnold, Richard Dennis, V. P.	Savannah, Ga.	1847
Arnold, S. Augustus	Providence, R. I.	1849
Arnold, S. R.	Monro, Mich.	1856
Arrowsmith, J. E.	Keyport, N. J.	1864
Asdale, Wm. James	Pittsburg, Pa.	1869
Ash, H. St. Clair	Philadelphia, Pa.	1864
Ashford, Francis A.	Washington, D. C.	1868
Ashmead, William	Philadelphia, Pa.	1847
Askew, Henry F. V. P.; P.	Wilmington, Del.	1847
Atchison, Thomas A.	Nashville, Tenn.	1857

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Atchinson, W. A.	Bowling Green, Ky.	1857
Atkinson, J. F	Lexington, Mo.	1854
Atkinson, Thomas C.	Baltimore, Md.	1848
Atkinson, Thomas P.	Danville, Va.	1852
Atkinson, William B. s.	Philadelphia, Pa.	1859
Atlee, John L.	Lancaster, Pa.	1847
Atlee, Walter F.	Philadelphia, Pa.	1855
Atlee, Washington L.	Philadelphia, Pa.	1847
Atwood, George	Fair Haven, Mass.	1860
Austin, A.	Sandusky, Ohio.	1856
Austin, James M.	Waterford, N.Y.	1853
Austin, T. R.	New Albany, Ind.	1859
Avent, B. W.	Murfreesboro', Tenn.	1848
Awl, Wm. M. v.p.	Columbus, Ohio.	1848
Axford, Samuel M.	Flint, Mich.	1855
Ayer, James	Boston, Mass.	1858
Ayers, H. P.	Fort Wayne, Ind.	1856
Ayers, S. C.	Fort Wayne, Ind.	1867
Ayres, Alfred	Lasourdsville, Ohio.	1856
†Ayres, Daniel [d. 1853]	Brooklyn, N. Y.	1847
Ayres, D. Cooper	Green Bay, Wis.	1856
Babb, L. P.	Eastport, Me.	1865
Babbitt, Nathan S.	North Adams, Mass.	1864
Babcock, Charles	New Hartford, N. Y.	1849
Babcock, M. N.	Saratoga Springs, N. Y.	1849
Bache, B. F.	Brooklyn, N. Y.	1853
†Bache, Franklin [d. 1864]	Philadelphia, Pa.	1847
Bache, Thomas Hewson	Philadelphia, Pa.	1855
Bacon, Charles Giles	Fulton, N. Y.	1855
Bacon, John	Boston, Mass.	1849
†Baer, M. S.	Baltimore, Md.	1848
Bahan, Thomas S.	New York, N. Y.	1855
Bailey, F. K.	Joliet, Ill.	1856
Bailey, R. S.	Charleston, S. C.	1852
Baily, Jonathan R.	Ferguson's Station, Ky.	1858
†Baker, Abraham H.	Cincinnati, Ohio.	1850
†Baker, Alfred	Baltimore, Md.	1848
†Baker, Charles L. [d. 1859]	Lancaster, Pa.	1847
Baker, George P.	Providence, R. I.	1855
†Baker, George R. [d. 1866]	Wilmington, Del.	1847

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Baker, John W. H.	Davenport, Iowa.	1860
Baker, Rufus	Middletown, Conn.	1853
Baker, T. H.	Wayne Co., Ohio.	1852
Baldwin, E. C.	Baltimore, Md.	1849
Baldwin, Henry R.	New Brunswick, N. J.	1864
Baldwin, Wm. Owen, P.	Montgomery, Ala.	1868
Ball, John,	Brooklyn, N. Y.	1853
Ballou, Ariel	Woonsocket, R. I.	1855
Baltzell, William H.	Baltimore, Md.	1855
Bancroft, Amos B.	Charlestown, Mass.	1847
Bancroft, Jesse B.	Concord, N. H.	1849
Banks, James L.	New York, N. Y.	1864
Banks, John T.	Zebulon, Ga.	1858
†Bare, A. S.	Lancaster, Pa.	1850
Barker, B. Fordyce	New York, N. Y.	1848
Barker, Sandford W.	Charleston, S. C.	1848
Barnes, John	St. Louis, Mo.	1854
Barnes, Julius S.	Southington, Conn.	1860
Barnett, C. V.	Windham Centre, N. Y.	1863
Barnett, James Richards	Vicksburg, Miss.	1869
Barney, John W.	Lancaster, N. H.	1865
Barnum, B.	Schoolcraft, Mich.	1856
Barr, George W.	Titusville, Pa.	1868
Barrett, S.	Le Roy, N. Y.	1856
Barrington, Samuel	U. S. Navy.	1855
Barrows, Ashbel W.	Hartford, Conn.	1853
Barrows, Charles	Clinton, N. Y.	1860
Barrows, Egbert S.	Davenport, Iowa.	1860
Barry, R. A.	New York, N. Y.	1865
Bartholow, Roberts	Cincinnati, Ohio.	1867
Bartlett, Ezra	Exeter, N. H.	1849
†Bartlett, George [d. 1864]	Boston, Mass.	1849
Bartlett, Homer Lyman	Flatbush, N. Y.	1858
Bartlett, John Knowlton	Milwaukee, Wis.	1854
Bartlett, Josiah	Concord, Mass.	1848
†Bartlett, Josiah	Stratham, N. H.	1847
†Bartlett, Lyman [d. 1865]	New Bedford, Mass.	1849
Barton, Edw.	South Orange, Mass.	1858
†Barton, Edward H. [d. 1859]	New Orleans, La.	1848
Bass, W. J.	Stevenson, Ala.	1857
Bass, Zaccheus	Middlebury, Vt.	1849

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Bassett, Moses F.	Quincy, Ill.	1864
Baskette, Wm. T.	Murfreesboro', Tenn.	1851
†Baskin, George W.	Mercer, Pa.	1850
Batchelder, D. Homer	Cranston, R. I.	1849
†Batchelder, John P. [d. 1868]	New York, N. Y.	1849
Batcheller, James	Fitzwilliam, N. H.	1848
†Batcheller, Stephen [d. 1848]	Royalston, Mass.	1848
Bateman, B. Rush	Cedarville, N. J.	1853
Bateman, Eli E.	Fairton, N. J.	1860
Bateman, Ephraim	Cedarville, N. J.	1858
Bates, Joseph N.	Worcester, Mass.	1854
Bates, J. W. P.	Baltimore, Md.	1865
Bates, S. S.	Titusville, Pa.	1868
Bates, Wm. Jourdan	Wheeling, West Va.	1848
Baumgarten, Fred. E.	St. Louis, Mo.	1854
Bauer, Louis	Brooklyn, N. Y.	1855
Baxley, H. Willis	Baltimore, Md.	1848
†Baxter, Hiram [d. 1865]	Stillwater, N. Y.	1849
Baxter, J. H.	Washington, D. C.	1865
Baxter, Samuel A.	Lima, Ohio.	1867
Bay, William	Albany, N. Y.	1853
Bayless, G. W.	Louisville, Ky.	1859
†Beach Samuel	Bridgeport, Conn.	1849
Beadle, Edward L. s.	Poughkeepsie, N. Y.	1848
Beales, Joseph	U. S. Navy.	1865
Bean, Luther C.	Lebanon, N. H.	1865
Beard, Cornelius	New Orleans, La.	1857
†Beardsley, Levi	Oneida, N. Y.	1858
Beardsley, Lucius N.	Milford, Conn.	1853
Beardsley, Sheldon	North Brandford, Conn.	1849
Beardsley, William H.	Coventry, N. Y.	1853
Beasley, Geo. F.	Lafayette, Ind.	1867
Beatty, George D.	Baltimore, Md.	1868
Beaver, D. Llewellyn	Reading, Pa.	1860
Beck, John C.	Cincinnati, Ohio,	1853
†Beck, T. Romeyn [d. 1855]	Albany, N. Y.	1852
Becker, Alexander R.	Providence, R. I.	1865
Beckwith, Josiah G.	Litchfield, Conn.	1855
Beebe, Seneca	McDonough, N. Y.	1853
Beech, J. H.	Coldwater, Mich.	1854
Beecher, H. H.	North Norwich, N. Y.	1858

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Beeler, George	Clinton, Ky.	1868
Belknap, Simeon	Rochester, Vt.	1865
Bell, A. Nelson	Brooklyn, N. Y.	1860
Bell, Artemas	S. Hampton, Mass.	1860
Bell, Cyrus	Feeding Hills, Mass.	1860
Bell, John	Philadelphia, Pa.	1847
†Bell, Luther V. [d. 1862]	Charlestown, Mass.	1849
Bell, T. S.	Louisville, Ky.	1850
†Bellinger, John	Charleston, S. C.	1851
Bemis, C. V.	Medford, Mass.	1865
†Bemis, David	Chickopee, Mass.	1849
Bemis, Jonathan W.	Charlestown, Mass.	1849
Bemiss, Sam. Merrifield, s.; v.p.	New Orleans, La.	1857
Benham, Silas N.	Pittsburg, Pa.	1868
Bennett, Ezra P.	Danbury, Conn.	1860
Bennett, Geo. C.	Erie, Pa.	1867
Bennett, Handford N.	Bridgeport, Conn.	1853
Bennett, John	Centreville, Mich.	1859
Benson, J. W.	Louisville, Ky.	1857
Beresford, S. B.	Hartford, Conn.	1848
Berkley, Hugh	Bloomfield, Ky.	1859
Berney, James	Montgomery, Ala.	1869
†Berry, William H. [d. 1859]	Washington, D. C.	1858
†Bertolet, P. G.	Oley, Pa.	1855
Best, David	Meadville, Pa.	1867
Bethune, George A.	Boston, Mass.	1849
Betton, Thomas F.	Germantown, Pa.	1849
Bevan Thomas	Chicago, Ill.	1863
Bibb, Geo. Richard	Jacksonville, Ill.	1869
Bibbins, William B.	New York, N. Y.	1864
†Bibighaus, C. H. [d. 1854]	Philadelphia, Pa.	1850
Bickford, Alphonso	Dover, N. H.	1865
Bicknell, S. W.	Beloit, Wis.	1863
Biddle, John B.	Philadelphia, Pa.	1848
Bidwell, Edwin	Deep River, Conn.	1868
Bigelow, A. A.	Attica, Ind.	1859
Bigelow, George F.	Boston, Mass.	1850
Bigelow, Henry	Newton, Mass.	1865
Bigelow, Henry Jacob	Boston, Mass.	1849
Bigelow, Jacob	Boston, Mass.	1849
Bigelow, John M.	Detroit, Mich.	1850

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Billings, John Shaw	Washington, D. C.	1868
Birckhead, Wm. Hunter	New York, N. Y.	1865
Bird, J. F.	Philadelphia, Pa.	1855
Bishop, Timothy H.	New Haven, Conn.	1847
Bissell, Daniel P.	Utica, N. Y.	1849
†Blackburn, C. J. [d. 1868]	Covington, Ky.	1850
Blackburn, H.	Ft. Madison, Iowa.	1867
Blackman, George	Westport, Conn.	1858
Blackman, Geo. C.	Cincinnati, Ohio.	1867
†Blair, Arba [d. 1863]	Rome, N. Y.	1860
Blair, A. R.	York, Pa.	1858
Blake, Eli Whitney	New Haven, Conn.	1864
Blake, John Ellis	Middletown, Conn.	1855
Blake, Jeremiah	Dracut, Mass.	1852
Blake John G.	Boston, Mass.	1865
Blakeman, Rufus	Fairfield, Conn.	1860
Blakeman, William N.	New York, N. Y.	1847
Blanchard, D. W.	Coventry, Vt.	1865
Blane, John	Perryville, N. J.	1855
Blaney, J. V. Z.	Chicago, Ill.	1855
†Blatchford, Thomas W. V. P. [d. 1865]	Troy, N. Y.	1847
Blawis, Reuben	Fort Miller, N. Y.	1864
Bliss, D. W.	Washington, D. C.	1868
Blodgett, Julius	West Brookfield, Mass.	1860
Blumenthal, Mark	New York, N. Y.	1864
Bly, Douglas	Rochester, N. Y.	1859
Bobbs, J. S.	Indianapolis, Ind.	1867
Bodine, J. M.	Louisville, Ky.	1867
Boerstler, G. H.	Lancaster, Ohio.	1850
Bogan, M. V. B.	Washington, D. C.	1868
Bogue, R. G.	Chicago, Ill.	1867
Bohrer, Benjamin S.	Georgetown, D. C.	1858
Boileau, Nathaniel B.	Everittstown, N. J.	1864
Boisnot, James M.	Philadelphia, Pa.	1865
Boker, Charles S.	Philadelphia, Pa.	1864
†Boling, Wm. M. V.P.	Montgomery, Ala.	1855
†Bolton, Jackson [d. 1866]	New York, N. Y.	1853
Bolton, James	Richmond, Va.	1852
†Bond, Henry [d. 1859]	Philadelphia, Pa.	1847
Bond, John W.	Toledo, Ohio.	1866

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Bond, Samuel S.	Washington, D. C.	1866
Bond, Thomas E.	Baltimore, Md.	1848
Bondurant, Walter Ernest	Natchez, Miss.	1869
Bonner, Stephen	Cincinnati, Ohio.	1856
Bonner, S. P.	Cincinnati, Ohio.	1867
Bontecou, Reed B.	Troy, N. Y.	1853
Booth, David Winfield	Vicksburg, Miss.	1869
Boring, Jesse	La Grange, Ga.	1851
Borland, J. Nelson	Boston, Mass.	1853
Bostwick, David E.	Litchfield, Conn.	1853
Boutelle, N. R.	Waterville, Me.	1856
Boutelle, Thomas R.	Fitchburg, Mass.	1853
Bowditch, Henry I. s.; v. p.	Boston, Mass.	1848
†Bowen, Samuel	Thompson, Conn.	1849
Bowling, Wm. Kendall, v. p.	Nashville, Tenn.	1854
Bowman, Charles	New Albany, Ind.	1859
Bowman, Edward Hale	Andalusia, Ill.	1869
Boyd, A. M.	Cave Spring, Ga.	1858
Boyd, Charles	Frederick, Md.	1850
Boyd, John M.	Knoxville, Tenn.	1857
Boyd, S. S.	Jacksonburg, Ind.	1856
Boyden, Frederick	Hinsdale, N. H.	1855
Boyer, Pierre Caverly	New Orleans, La.	1869
Boynton, H. G.	Elizabethtown, Ind.	1859
Bozeman, Nathan	New York, N. Y.	1858
Braby, Norman W.	Chelsea, Vt.	1865
Bradbury, A. B.	Milton, Ind.	1867
Bradbury, James C.	Oldtown, Me.	1860
Bradley, O. H.	E. Jaffrey, N. H.	1865
Bradford, George W.	Homer, N. Y.	1847
Bradford, J. T.	Augusta, Ky.	1855
Bradford, Milton	West Woodstock, Conn.	1849
Bradnor, N. Roe	Warwick, N. Y.	1867
Brady, John A.	Brooklyn, N. Y.	1856
†Brainard, Daniel, v. p. [d. '66]	Chicago, Ill.	1850
Brakely, P. F.	Belvidere, N. J.	1853
Bramble, D. D.	Cincinnati, Ohio.	1867
Brannock, J. M.	McLemorsville, Tenn.	1859
Branson, Smith	Chester Hill, Ohio.	1856
†Breckinridge, R. J. v.p. [d. '67]	Louisville, Ky.	1850
Breinig, P. B.	Hellertown, Pa.	1865

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Breitenbach, Jeremiah	Myerstown, Pa.	1847
Brengle, Daniel D.	Winchester, Ill.	1863
Bridges, Robert	Philadelphia, Pa.	1847
Briggs, George C.	Franklin, Vt.	1865
Briggs, William H.	Rochester, N. Y.	1856
Briggs, Wm. Thompson	Nashville, Tenn.	1869
Brigham, Charles W.	Pittsfield, Vt.	1865
Brigham, Norman	North Mansfield, Conn.	1848
Brinkerhoft, T. S.	Auburn, N. Y.	1868
Brinley, Edward H.	Hartford, Conn.	1858
†Brinsmade, T. C. V. P. [d. 1868]	Troy, N. Y.	1848
Brinton, John B.	West Chester, Pa.	1853
Brinton, Wm. B.	West Chester, Pa.	1868
Brisbane, W. Henry, V. P.	Arena, Wis.	1856
†Briscoe, John Hanson	Baltimore, Md.	1847
Brodie, Wm. S.	Detroit, Mich.	1854
Bronson, Henry	New Haven, Conn.	1850
Bronson, John R.	Attleboro', Mass.	1860
Brooks, John N.	Richmond, Va.	1847
Brooks, P. B.	Binghampton, N. Y.	1853
Brown, Alex. Porter	Clinton, La.	1869
Brown, Benj. Stanton	Bellefontaine, Ohio.	1857
Brown, Buckminster	Boston, Mass.	1849
Brown, Erasmus O.	Brandenberg, Ky.	1859
Brown, Francis H.	Boston, Mass.	1865
Brown, Jas.	Waterbury, Conn.	1858
Brown, Hiram S.	St. Johnsbury, Vt.	1865
Brown, J. A.	Detroit, Mich.	1856
Brown, Jos. Clark	Urbana, Ohio.	1864
Brown, J. H.	Lawrenceburg, Ind.	1859
Brown, J. J.	Madison, Wis.	1855
Brown, James L.	New York, N. Y.	1864
Brown, Jonathan	Tewksbury, Mass.	1849
Brown, Orlando	Wrentham, Mass.	1860
Brown, P. F.	Acowac, Va.	1855
Brown, Pike	Barwell, S. C.	1857
†Brown, Thomas	Manchester, N. H.	1849
Brown, W. Owen	Providence, R. I.	1855
Brown, W. T.	Cincinnati, Ohio.	1867
†Browne, O. A. [d. 1855]	Hicksford, Va.	1852
†Brownell, Clarence M. [d. '62]	East Hartford, Conn.	1853

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†Brownell, Richmond	Providence, R. I.	1853
†Brownell, Russ B. [d. 1867]	New York, N. Y.	1864
Brownell, William R.	Hartford, Conn.	1860
Browning, A. T.	Olneyville, R. I.	1867
Brown-Séquard, C. E.	New York, N. Y.	1865
Bruce, G. D.	Pittsburg, Pa.	1854
Bruce, James M.	Lexington, Ky.	1867
Brumley, John D.	Newark, N. J.	1866
Brush, H. Mortimer	New York, N. Y.	1864
Bryan, James	Philadelphia, Pa.	1848
Bryan, Joseph R.	Philadelphia, Pa.	1847
Bryan, Stanton B.	Brownsboro', Ky.	1859
Buchtel, J. B.	Des Moines, Iowa.	1863
†Buck, Ephraim [d. 1859]	Boston, Mass.	1849
Buck, Gurdon	New York, N. Y.	1848
Buck, W. D.	Manchester, N. H.	1849
Buckler, Thomas H.	Baltimore, Md.	1848
Buckner, James H.	Cincinnati, Ohio.	1864
Buckner, Philip J.	Georgetown, Ohio.	1850
Budd, A. E.	Medford, N. Y.	1853
Budd, Charles A.	New York, N. Y.	1858
Budlong, Caleb	Frankford, N. Y.	1854
Buell, Richard M.	Brooklyn, N. Y.	1864
Buell, Henry W.	Litchfield, Conn.	1860
Buffington, Thos. Jefferson	Baton Rouge, La.	1869
Buist, J. N.	Nashville, Tenn.	1866
Bulkley, Henry D.	New York, N. Y.	1847
Bulkley, John W.	Washington, D. C.	1866
Bullard, Gates B.	St. Johnsbury, Vt.	1865
†Bullard, Talbut [d. 1863]	Indianapolis, Ind.	1851
Bullock, Otis	Warren, R. I.	1864
Bullock, William R.	Wilmington, Del.	1855
Bullock, Wm. Townsend	Providence, R. I.	1868
Bumstead, Freeman J.	New York, N. Y.	1865
Bunce, James	Galesburg, Ill.	1854
Burbank, Alexander	Lewiston, Me.	1865
Burden, Jesse R.	Philadelphia, Pa.	1847
Burdick, Francis	Johnston, N. Y.	1865
Burford, J. S.	Whiteville, Tenn.	1857
Burge, J. H. Hobart,	Brooklyn, N. Y.	1857
Burgess, E. P.	Dedham, Mass.	1865

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Burke, George W.	Middletown, Conn.	1855
Burke, John	New York, N. Y.	1868
Burnap, Sewall G.	Holliston, Mass.	1853
Burnham, Walter	Lowell, Mass.	1867
Burnham, Z. P.	Lowell, Mass.	1849
Burns, Robert	Philadelphia, Pa.	1865
†Burr, David Silliman [d.'65]	Westport, Conn.	1855
Burr, George	Binghampton, N. Y.	1865
†Burrowes, Francis S.	Lancaster, Pa.	1848
Burruss, J. L.	Louisa C. H., Va.	1850
†Burton, C. V. W. [d. 1860]	Lansingburg, N. Y.	1849
Burton, Matthew Henry	Troy, N. Y.	1869
†Burwell, Bryant	Buffalo, N. Y.	1847
Burwell, George N.	Buffalo, N. Y.	1850
Bush, James Miles	Lexington, Ky.	1850
Bush, Lewis P.	Wilmington, Del.	1847
Bushnell, J. H.	Washington, D. C.	1868
Butcher, Charles	Maurice Town, N. J.	1853
†Butler, A. B.	Richmond, Ind.	1859
Butler, John S.	Hartford, Conn.	1860
Butler, S. W.	Philadelphia, Pa.	1853
†Butterfield, John	Columbus, Ohio.	1847
Buxton, Benj. F.	Warren, Me.	1865
Byford, William H. V. P.	Chicago, Ill.	1854
Byrne, J.	Brooklyn, N. Y.	1864
Cabaniss, Alfred Barwell	Jackson, Miss.	1866
Cabell, J. G.	Richmond, Va.	1847
Cabell, J. D.	Charlottesville, Va.	1855
Cabot, Samuel	Boston, Mass.	1849
Cahoon, Charles S.	Lyndon, Vt.	1865
Cain, Daniel J.	Charleston, S. C.	1851
Cain, John S.	Pontotoc, Miss.	1857
Cain, W. S.	Marion, Ky.	1859
Caldwell, W. B.	Louisville, Ky.	1859
Calkins, Alonzo	New York, N. Y.	1849
Calkins, Marshall	Hampden, Mass.	1866
Callander, Jno. H.	Nashville, Tenn.	1857
Call, Nathan	Suncook, N. H.	1865
Cameron, R. A.	Valparaiso, Ind.	1856
†Cammann, G. P.	New York, N. Y.	1853
Campbell, Daniel	Saxton's Riv., Vt.	1860

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Campbell, Harvey	Voluntown, Conn.	1849
Campbell, Henry Frazer, V. P.	Augusta, Ga.	1851
Campbell, Robert	Augusta, Ga.	1849
†Canfield, J. W.	Morristown, N. J.	1849
Canfield, Joel	Guilford, Conn.	1848
Capron, George	Providence, R. I.	1849
Carey, Abel	Salem, Ohio.	1855
Carleton, Charles M.	Norwich, Conn.	1865
Carmalt, W. H.	New York, N. Y.	1864
Carmichael, George F.	Fredericksburg, Va.	1847
Carpenter, H.	Hancock, Mich.	1858
Carpenter, Henry	Lancaster, Pa.	1847
Carpenter, Horace	Blue Grass, Iowa.	1860
Carpenter, James S.	Pottsville, Pa.	1849
Carpenter, John T.	Pottsville, Pa.	1867
Carpenter, Nelson	Warren, Mass.	1856
Carpenter, Walter	Burlington, Vt.	1849
†Carpenter, Wm. M.	New Orleans, La.	1847
Carr, Alonzo F.	Goffstown, N. H.	1849
†Carr, Edson [d. 1861]	Canandaigua, N. Y.	1848
†Carr, John	Sanbornton, N. H.	1849
Carrick, A. L.	Cincinnati, Ohio.	1867
†Carrington, Edwin W.	Farmington, Conn.	1849
Carrington, Henry A.	New Haven, Conn.	1868
Carroll, O. A.	Cochecton, N. Y.	1867
Carroll, Thomas	Cincinnati, Ohio.	1850
Carson, Joseph	Philadelphia, Pa.	1847
Carson, William	Cincinnati, Ohio.	1850
Carter, Ezra	Concord, N. H.	1849
Carter, Francis	Columbus, Ohio.	1850
Carter, Galen	New York, N. Y.	1853
Cary, H. G.	Indianapolis, Ind.	1850
Cary, L. H.	Toledo, Iowa.	1863
Cary, Walter	Buffalo, N. Y.	1848
Case, Jonathan H.	Albany, N. Y.	1853
Casey, James E.	Mohawk, N. Y.	1860
†Cash, Merritt H. [d. 1861]	Ridgebury, N. Y.	1852
†Cassidy, Patrick [d. 1865]	Lancaster, Pa.	1853
Castleman, Alfred L.	Delafield, Wis.	1855
†Castle, Andrew	Woodbridge, Conn.	1853
Castleberry, Isaac	Evansville, Ind.	1859

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Catlin, Benjamin H.	West Meriden, Conn.	1853
Cattell, Samuel G.	Deerfield, N. J.	1866
Cavenagh, W. C.	Memphis, Tenn.	1859
Chabert, Romeo F.	Hoboken, N. J.	1864
Chace, John B.	Taunton, Mass.	1865
Chadwick, George H.	Portland, Me.	1860
Chaffee, C. C.	Springfield, Mass.	1858
Chaillé, Standford Emerson	New Orleans, La.	1869
Chamberlain, C. N.	Lawrence, Mass.	1858
Chamberlain, W. O.	Princeton, Ill.	1863
Chamberlaine, J. E. M.	Easton, Md.	1855
Chamberlayne, John K.	Cazenovia, N. Y.	1856
Chambers, Wm. Mortimer	Charleston, Ill.	1852
Chandler, Charles B.	Montpelier, Vt.	1849
Chandler, Charles Quarles	Rockfort, Mo.	1854
Channing, Walter	Boston, Mass.	1849
Chapin, Alonzo	Winchester, Mass.	1860
Chapin, Lebbeus C.	New Haven, Conn.	1866
Chapin, Wm. A.	Ludlow, Vt.	1860
Chapman, E. N.	Brooklyn, N. Y.	1860
†Chapman, Nathaniel, P. [d.'53]	Philadelphia, Pa.	1847
Chapman, Thomas L.	Long Meadow, Mass.	1853
Charlton, S. H.	Seymour, Ind.	1867
Charters, Wm. M.	Savannah, Ga.	1866
†Chase, Charles	Deerfield, N. H.	1849
Chatard, Jr. Ferd. E.	Baltimore, Md.	1868
Cheatham, W. A.	Nashville, Tenn.	1857
Cheeny, Wm. Mahan	Kenton, O.	1869
†Cheeny, L. P. [d. 1863]	Chicago, Ill.	1863
†Cheeseman, Jno. C. [d. 1862]	New York, N. Y.	1853
Cheever, David W.	Boston, Mass.	1865
Cheston, Daniel Murray	Philadelphia, Pa.	1866
Chetwood, George R.	Elizabethtown, N. J.	1852
†Chew, Samuel [d. 1863]	Baltimore, Md.	1847
†Childs, Henry H. [d. 1868]	Pittsfield, Mass.	1849
Childs, Seth L.	East Hartford, Conn.	1860
†Childs, Timothy	Pittsfield, Mass.	1860
Chipley, W. S.	Lexington, Ky.	1857
Choate, George	Salem, Mass.	1853
Christian, M. P.	Lynchburg, Va.	1868
Chubbuck, H. S.	Elmira, N. Y.	1853

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Church, Jefferson	Springfield, Mass.	1865
†Church, William Henry	New York, N. Y.	1853
†Clanton, S. W.	Warsaw, Ala.	1854
Clapham, Edward	Kalamazoo, Mich.	1866
Clapp, Asahel	New Albany, Ind.	1850
Clapp, Sylvanus	Pawtucket, R. I.	1849
Clapp, Wm. A.	New Albany, Ind.	1853
Clark, Alonzo	New York, N. Y.	1847
Clark, Charles	Montpelier, Vt.	1855
Clark, C. M.	Galva, Ill.	1863
Clark, David D.	Philadelphia, Pa.	1859
Clark, H. C.	Woodbury, N. J.	1858
Clark, Henry G.	Boston, Mass.	1849
Clark, John McWhorter	Mount Hope, Ala.	1869
Clark, Lucius	Rockford, Ill.	1863
†Clark, Moses	East Cambridge, Mass.	1853
Clark, Ripley	Winsdor, Vt.	1865
Clark, Robert H.	Milford, Del.	1855
Clark, Samuel S.	Belvidere, N. J.	1866
Clark, William N.	Stafford, Conn.	1860
Clarke, Alpheus B.	Holyoke, Mass.	1860
Clarke, A. Bryant	Brooklyn, N. Y.	1864
Clarke, Edward H.	Boston, Mass.	1847
Clarke, Henry	Worcester, Mass.	1860
Clarke, J. Henry	Newark, N. J.	1851
Clarke, Rowan	Antistown, Pa.	1867
Clarke, Rowse R.	Whitinsville, Mass.	1860
Clawson, James Emory	Smyrna, Del.	1864
Clayton, H. H.	Murfreesboro', Tenn.	1857
Cleaveland, C. D.	Boston, Mass.	1865
Cleaver, H. T.	Keokuk, Iowa.	1868
Cleaver, W. W.	Lebanon, Ky.	1859
Clements, Bennett Augustin	U. S. Army.	1864
Clements, H. M.	Clementsville, Tenn.	1854
Clements, Joshua	Dayton, Ohio.	1854
Clements, W. M.	Gainsboro', Tenn.	1857
Clendenin, Wm. H.	Baltimore, Md.	1866
Clendennin, William	Cincinnati, Ohio.	1854
†Cleveland, Hiram	North Providence, R. I.	1853
Cleveland, J. M.	Utica, N. Y.	1860
Cliff, D. B.	Franklin, Tenn.	1857

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†Clifford, Lewis W.	Providence, R. I.	1847
Clymer, George	U. S. Navy.	1858
Clymer, Meredith	New York, N. Y.	1848
†Coad, Joseph R. [d. 1868]	Philadelphia, Pa.	1865
†Coale, William Edw. [d. 1863]	Boston, Mass.	1849
Coates, Benjamin Horner	Philadelphia, Pa.	1847
Cobb, H. P.	Detroit, Mich.	1856
Cobb, L. H.	Detroit, Mich.	1857
Cobb, J. V.	Rome, N. Y.	1856
Cochran, Jerome	Mobile, Ala.	1869
Cochrane, Charles	Toledo, Ohio.	1856
Cock, Thomas	New York, N. Y.	1847
Cock, Thomas F.	New York, N. Y.	1848
Cockey, Joseph C.	Baltimore, Md.	1866
Cockrill, James J.	Baltimore, Md.	1866
†Cockcroft, James	New York, N. Y.	1853
Coe, A. B.	Oswego, N. Y.	1853
Coffey, Henry T.	Pittsburg, Pa.	1866
Coffin, Amory	Aiken, S. C.	1851
Cogley, T. J.	Madison, Ind.	1858
Cogswell, George	Bradford, Mass.	1849
Cogswell, William H.	Plainfield, Conn.	1860
Cohen, Joshua S.	Baltimore, Md.	1848
Cohen, Jacob Solis	Philadelphia, Pa.	1864
Coit, Daniel T.	Boston, Mass.	1853
Colburn, E. M.	Peoria, Ill.	1854
†Cole, N. W.	Burlington, N. J.	1847
Coleman, James B.	Trenton, N. J.	1855
Coleman, J. P.	Pemberton, N. J.	1855
Coles, Abram	Newark, N. J.	1859
Coles, Levant B.	Batavia, N. Y.	1856
Colley, Francis S.	Monroe, Ga.	1858
Collins, Benjamin M.	Penn's Park, Pa.	1864
Collins, Clarkson T.	Great Barrington, Mass.	1849
Collins, George Lewis	Providence, R. I.	1849
Collins, James	Philadelphia, Pa.	1868
Collins, Wm. T.	Smyrna, Del.	1866
Colony, George D.	Fitchburg, Mass.	1864
Colt, John	Batavia, N. Y.	1858
Colt, E. N.	Brooklyn, N. Y.	1864
Colvin, Darwin	Clyde, N. Y.	1864

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Comegys, Cornelius G.	Cincinnati, Ohio.	1853
Comings, Benjamin N.	New Britain, Conn.	1849
Compton, Henry Maclin	Nashville, Tenn.	1869
Compton, Wm. McCorkle	Holly Springs, Miss.	1869
Comstock, William W.	Middleboro', Mass.	1849
†Conant, D. S. [d. 1865]	New York, N. Y.	1855
†Condict, Lewis, V. P.	Morristown, N. J.	1853
Condie, D. Francis, T.	Philadelphia, Pa.	1847
Congar, Horace M.	Buffalo, N. Y.	1850
Conklin, H. Smith	Sidney, Ohio.	1850
Conner, P. S.	Cincinnati, Ohio.	1867
Connolly, James J.	New York, N. Y.	1864
Conover, Robert R.	Red Bank, N. J.	1864
†Conrey, Jno.	Manayunk, Pa.	1855
Converse, Shubael	Norwich, Vt.	1849
†Conway, James H.	Richmond, Va.	1860
Conwell, Ira	Nashville, Tenn.	1856
Cook, A. B.	Louisville, Ky.	1855
†Cook, Chas.	Jersey City, N. J.	1853
Cook, E. P.	Mendota, Ill.	1868
Cook, J. B.	Henderson, Ky.	1859
Cook, Simeon A.	Buskirk's Bridge, N. Y.	1847
Cooke, A. T. M.	Norfolk, Va.	1850
Cooke, John	Englishtown, N. J.	1864
Coolidge, Charles	Warsaw, Ill.	1856
Coolidge, James	Athol, Mass.	1865
†Coolidge, R. Hoffman [d. '66]	Washington, D. C.	1853
Coons, Israel A.	Middletown, Ohio.	1854
Coons, J. B.	Courtland, Ala.	1859
†Cooper, James S. [d. 1867]	New York, N. Y.	1853
Cooper, Richard M.	Camden, N. J.	1847
Coopins, P. G.	Fairweather, Ill.	1854
Corliss, Hiram	Greenwich, N. Y.	1847
†Cornish, Aaron	New Bedford, Mass.	1849
Corse, James M.	Philadelphia, Pa.	1855
Corson, Hiram	Plymouth Meeting, Pa.	1847
Corson, Joseph	Portsmouth, Ohio.	1853
Corson, Thomas J.	Trenton, N. J.	1855
Corson, William	Norristown, Pa.	1854
Corwin, J. Albert	Newark, N. J.	1868
Cotes, John	Batavia, N. Y.	1858

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Cotnam, T. T.	Stevenson, Ala.	1857
Cotting, B. E.	Roxbury, Mass.	1849
Cotton, D. B.	Portsmouth, Ohio.	1859
Cotton, John C.	Meadville, Pa.	1867
Cotton, J. D.	Marietta, Ohio.	1853
†Couper, James, V. P. [d. 1865]	New Castle, Del.	1847
Coursen, W. S.	New Foundland, N. J.	1865
Coventry, Charles B.	Utica, N. Y.	1849
Cowan, George	Danville, Ky.	1867
Cowles, Henry	Saxonville, Mass.	1860
Cox, Benjamin	Salem, Mass.	1855
Cox, Christopher C. V. P.	Baltimore, Md.	1848
Cox, Edward	Battle Creek, Mich.	1856
Craft, M. Sidney	Jackson, Miss.	1869
Crafts, E. G.	Binghampton, N. Y,	1864
Craig, B. F.	Washington, D. C.	1868
†Craig, John W. [d. 1863]	Plainfield, N. J.	1853
Cramer, Isaac S.	Sergeantsville, N. J.	1863
Crandall, R. O.	Laporte, Ind.	1863
†Crandell, C. Milford [d. 1867]	Belfast, N. Y.	1853
Crane, Isaac L.	Ashland, Ohio.	1860
Crane, James	Brooklyn, N. Y.	1858
Crane, Joseph S.	New York, N. Y.	1854
Crane, Phineas M.	East Boston, Mass.	1849
Crary, David	Hartford, Conn.	1858
Crawford, George G.	Atlanta, Ga.	1868
Creigh, Thomas	Lewisburg, West Va.	1852
Crews, James H.	Upshur, Ohio.	1850
Crispell, Abm.	Rondout, N. Y.	1860
Crist, D. L.	Bloomington, Ill.	1865
Crittendon, A. G.	Clifton Springs, N. Y.	1864
Croggon, Richard C.	Washington, D. C.	1864
Crosby, Dixi	Hanover, N. H.	1849
Crosby, George A.	Manchester, N. H.	1864
Crosby, Josiah, V. P.	Manchester, N. H.	1847
Crosby, Thomas R.	Hanover, N. H.	1849
Cross, Enoch	Newburyport, Mass.	1860
Crothers, E. K.	Bloomington, Ill.	1857
Crouse, D. F.	Mount Carroll, Ill.	1863
Crume, Pliny M.	Eaton, Ohio.	1850
Cullen, Thomas F.	Camden, N. J.	1855

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Cummings, Silas	Fitzwilliam, N. H.	1849
Cummings, William	Smyrna, Del.	1847
Cummins, David	Louisville, Ky.	1859
Cummins, Robert H.	Wheeling, West Va.	1868
Cummiskey, James	Philadelphia, Pa.	1860
Cunningham, Jno. A.	Richmond, Va.	1852
†Cunningham, Oliver [d. '60]	Beaver, Pa.	1858
Curran, B.	Jeffersonville, Ind.	1859
Currey, James H.	Baltimore, Md.	1866
†Currey, R. O.	Knoxville, Tenn.	1857
Currie, Thomas H.	Enfield, N. H.	1856
Currie, Wm. A.	Jefferson City, Mo.	1854
Curry, James Hart	Shrub Oak, N. Y.	1860
Curtis, Edward	Georgetown, D. C.	1868
Curtis, Hall	Boston, Mass.	1865
Curtis, J. B.	Decatur, Ill.	1859
Curtis, Levi	Philadelphia, Pa.	1855
Cushman, T. T.	Lunenburgh, Vt.	1865
Cutler, Samuel Prentiss	Holly Springs, Miss.	1869
†Cutter, Benjamin	Woburn, Mass.	1849
†Cutter, Nehemiah	Pepperell, Mass.	1847
Cuyler, John M.	United States Army.	1853
Dabney, C. R.	Clarksville, Tenn.	1854
Da Costa, J. M.	Philadelphia, Pa.	1855
Daggett, David L.	New Haven, Conn.	1860
†Dailey, E. D.	Smyrna, Del.	1858
Dale, William J.	Boston, Mass.	1849
Dallam, William M.	Harford County, Md.	1848
Dallas, Alex. J.	Camillus, N. Y.	1864
†Dalton, Jno. C. [d. 1864]	Lowell, Mass.	1848
Dalton, John C.	New York, N. Y.	1853
Dalton, N.	Mineral Point, Wis.	1867
Daly, William H.	Pittsburg, Pa.	1868
Damon, Howard F.	Boston, Mass.	1864
†Dana, A. G.	Brandon, Vt.	1849
Dana, David	Lawrence, Mass.	1865
Dana, Israel T.	Portland, Me.	1865
Dana, Samuel W.	New York, N. Y.	1860
Dancy, Francis William	Holly Springs, Miss.	1869
Dandridge, A. S.	Cincinnati, Ohio.	1850

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Danforth, James	New Boston, N. H.	1849
Daniels, E.	Union, N. Y.	1856
†Darlington, Wm. [d. 1863]	Westchester, Pa.	1851
Darnall, M. D.	Bainbridge, Ind.	1856
Darnall, T. M.	Atlanta, Ga.	1858
Davenport, Lewis	Detroit, Mich.	1857
†Davis, Charles A.	Chelsea, Mass.	1853
Davis, E. G.	Underwood, Ky.	1857
Davis, E. H.	New York, N. Y.	1850
Davis, Henry G.	New York, N. Y.	1863
Davis, Jno.	Dayton, Ohio.	1850
Davis, John	Cincinnati, Ohio,	1867
Davis, J. W.	Carlisle, Ind.	1859
Davis, Nathan Smith, V. P.; P.	Chicago, Ill.	1847
Davis, P. W.	Chapel Hill, Tenn.	1857
Davis, Razin P.	Parkersburg, West Va.	1867
†Davis, Robert T.	Fall River, Mass.	1855
Davis, S.	Columbus, Ind.	1859
Davis, W. B.	Cincinnati, Ohio.	1863
Davis, William H.	Baltimore, Md.	1848
Dawson, Benj. Frederick	New York, N. Y.	1869
Dawson, James	St. Michael's, Md.	1852
†Dawson, Jno. [d. 1867]	Columbus, Ohio.	1855
Dawson, J. L.	Charleston, S. C.	1851
Dawson, J. R.	Bellbrook, Ohio.	1858
Dawson, W. W. s.	Cincinnati, Ohio,	1859
Dayton, Alfred B.	Middletown Point, N. J.	1858
Deal, Lemuel J.	Philadelphia, Pa.	1868
Dean, H. K.	Mauckport, Ind.	1863
Dean, H. W.	Rochester, N. Y.	1855
Dean, Richard C.	Camden, N. J.	1864
Dearborne, A. D.	Cliftondale, Mass.	1849
De Bruler, J. P.	Evansville, Ind.	1867
De Camp, Wm. H.	Grand Rapids, Mich.	1867
De Forest, Wm. B.	New Haven, Conn.	1864
Delafield, Edward	New York, N. Y.	1853
Delamater, Jacob J.	Cleveland, Ohio.	1853
Delano, B. L.	Lockport, N. Y.	1863
Delany, M. G.	United States Navy.	1849
Dement, J. J.	Meridianville, Ala.	1857
Deming, J. P. H.	Palmyra, N. Y.	1853

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Deming, Ralph	Sharon, Conn.	1856
Denig, Robert M.	Columbus, Ohio.	1864
Deniston, E. E.	Northampton, Mass.	1858
Denton, S.	Ann Arbor, Mich.	1856
Denny, A.	Suggsville, Ala.	1855
Denny, D. W. C.	Ligonier, Ind.	1867
Derby, Hasket	Boston, Mass.	1864
†Dering, Nicoll H. [d. 1867]	Utica, N. Y.	1849
De Saussure, H. W.	Charleston, S. C.	1850
Detmold, W.	New York, N. Y.	1853
Detwiler, B. H.	Williamsport, Pa.	1866
Dewey, Charles F.	Goldsboro', N. C.	1855
De Witt, M. F.	White Hall, Ill.	1863
Dicken, James L.	Somerset, Ind.	1856
Dickey, Abraham O.	Lyme, N. H.	1847
Dickey, Hanover	Lowell, Mass.	1849
Dickey, William	Centerville, Ind.	1850
Dickinson, Edward	Peoria, Ill.	1850
Dickinson, Francis L.	Willington, Conn.	1853
Dickson, John	Baltimore, Md.	1866
†Dickson, James H. [d. 1863]	Wilmington, N. C.	1852
Dickson, Samuel H.	Philadelphia, Pa.	1851
Didama, Henry P.	Syracuse, N. Y.	1864
Dillard, John	Lexington, Ky.	1869
Dillard, Thomas	Philadelphia, Pa.	1855
Dillon, A. S.	Faronville, Va.	1855
†Dilworth, Samuel	Pittsburg, Pa.	1850
Disbrow, S. M.	Lower Squankum, N. J.	1860
Disnukes, Jno. L.	Mayfield, Ky.	1859
Divine, Kinsman Clinton	Canton, Miss.	1857
Dix, John H.	Boston, Mass.	1849
Dock, George	Harrisburg, Pa.	1866
Dodge, David	Chicago, Ill.	1863
Dodge, D. A.	Brooklyn, N. Y.	1860
Dodge, J. S.	Cincinnati, Ohio,	1850
Doggott, Perez F.	Wareham, Mass.	1864
Doherty, G. A.	Cincinnati, Ohio.	1859
†Donaghe, William R.	New York, N. Y.	1860
Donaldson, Francis	Baltimore, Md.	1848
†Donoughue, Eugene O. [d. '67]	Bergen, N. Y.	1853
Doolittle, A. F.	Herkimer, N. Y.	1853

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Dorr, J. C.	Medford, Mass.	1868
Dorset, J. L.	Genito, Va.	1855
Dorsey, G. Volney	Piqua, Ohio.	1856
Dorsey, J. H.	Huntingdon, Pa.	1855
†Dorsey, Lloyd	Frederick, Md.	1848
Douglas, George	Oxford, N. Y.	1869
Douglas, Isaac H.	Utica, N. Y.	1860
Douglass, S H.	Ann Arbor, Mich.	1856
Dougherty, Alexander N.	Newark, N. J.	1853
Doughty, W. H.	Augusta, Ga.	1859
Douseman, John B.	Milwaukee, Wis.	1854
Dove, George M.	Washington, D. C.	1853
Dove, James	Richmond, Va.	1852
Dove, John	Richmond, Va.	1852
Dowell, Greenville	Galveston, Texas.	1866
†Dowler, Bennett	New Orleans, La.	1850
Downes, Charles S.	Barnet, Vt.	1864
†Downes, John K.	New Haven, Conn.	1855
Downes, Nathaniel	Hanover, Mass.	1868
Downing, Eleazer B.	Preston, Conn.	1849
Downs, Henry S.	New York, N. Y.	1848
Doyle, J. A.	Baltimore, Md.	1866
Drake, Benjamin	New York, N. Y.	1864
†Drake, Daniel	Cincinnati, Ohio.	1850
Draper, John C.	New York, N. Y.	1866
Draper, John W.	New York, N. Y.	1847
Draper, L. J.	Washington, D. C.	1868
†Drayton, Henry E. [d. 1862]	Philadelphia, Pa.	1851
Drew, O. W.	Waterbury, Vt.	1849
Drew, S. Watson	Woburn, Mass.	1865
Drinkard, Wm. B.	Washington, D. C.	1868
Drowne, Henry W.	Richmond, Mass.	1865
Drury, Samuel S.	Bristol, R. I.	1868
Dubois, Abram	New York, N. Y.	1847
Dudley, Wm. H.	Brooklyn, N. Y.	1864
†Duffield, Samuel	Lancaster, Pa.	1847
Dugas, L. A.	Augusta, Ga.	1847
Duhamel, Wm. Jas. Chamberlin	Washington, D. C.	1853
Dublin, Alexander F.	Baltimore, Md.	1848
Dunahue, Henry James	Sandusky, Ohio.	1856
Dunbar, John R. W. s.	Baltimore, Md.	1847

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Duncan, Chas. M.	Shelburne, Mass.	1866
†Dunglison, Robley [d. 1869]	Philadelphia, Pa.	1857
Dunlap, A.	Springfield, Ohio.	1855
Dunlap, James	Northampton, Mass.	1858
Dunlap, James P.	Syracuse, N. Y.	1864
Dunlap, Richard William	Danville, Ky.	1869
Dunn, Theophilus C. V. P.	Newport, R. I.	1847
Durham, Henry	La Salle, Ill.	1863
Dwyer, John	New York, N. Y.	1864
†Dwight, W. C.	Moscow, N. Y.	1853
†Dwight, William W.	New York, N. Y.	1860
Dyer, Ezra	Philadelphia, Pa.	1864
Dyer, John	Doylestown, Pa.	1855
Dyer, J. Franklin	Gloucester, Mass.	1865
Earle, Silas	Onargo, Ill.	1863
Eastman, Edmund T.	Boston, Mass.	1855
Eastman, N. H.	Geneva, N. Y.	1853
Eastman, Josiah C.	Hampstead, N. H.	1849
Eastman, Louis M.	Baltimore, Md.	1867
Eaton, Harrison	Merrimack, N. H.	1849
Eaton, T. J.	Toledo, Ohio.	1850
Edgar, W. S.	Jacksonville, Ill.	1854
Edge, John P.	Downington, Pa.	1858
Edmiston, T. K.	Clinton, Ill.	1857
Edwards, Nathaniel B.	North Chelmsford, Mass.	1858
Edwards, R. A.	Wallon, Ky.	1850
Effinger, M.	Lancaster, Ohio.	1850
Egery, Edward A.	Three Rivers, Mich.	1863
Ehler, J. Augustus	Lancaster, Pa.	1848
†Elbert, John D. [d. 1866]	Keosaqua, Iowa.	1854
Eldredge, James H.	East Greenwich, R. I.	1855
Eliot, Ellsworth	New York, N. Y.	1860
Eliot, Johnson	Washington, D. C.	1858
Elliot, George T., Jr.	New York, N. Y.	1855
Elliott, Thomas A.	Orangeburg, S. C.	1851
Ellis, Calvin	Boston, Mass.	1853
Ellis, Charles M.	Elkton, Md.	1866
†Ellis, J. James	Bristol, R. I.	1860
Ellis, S. G.	Lima, N. Y.	1868
Ellmaker, Thomas	Lancaster, Pa.	1850

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Elmer, William	Bridgeton, N. J.	1850
Elmer, Wm., Jr.	Bridgeton, N. J.	1868
Elsberg, Louis	New York, N. Y.	1864
Elsten, W. P.	Columbia, Ohio.	1867
Ely, Edward	New Hope, Pa.	1850
Ely, John F.	Cedar Rapids, Iowa.	1854
Ely, James W. C.	Providence, R. I.	1849
Ely, W. W.	Rochester, N. Y.	1856
Emanuel, Manley	Philadelphia, Pa.	1855
Emerson, Gouverneur	Philadelphia, Pa.	1847
Emerson, N.	Orland, Me.	1854
Emmit, Thomas Addis	New York, N. Y.	1855
Emmons, Lewis	Hartland, Vt.	1863
Emory, Thomas	Washington, D. C.	1868
Engleman, George	St. Louis, Mo.	1854
English, J. S.	Manalapan, N. J.	1860
Enos, De Witt C.	Brooklyn, N. Y.	1856
Ensign, E. L.	McDonough, N. Y.	1868
Epperson, J. P.	Pulaski, Tenn.	1857
Erwin, A. J.	Fort Wayne, Ind.	1863
Eshleman, Isaac Stouffer	Philadelphia, Pa.	1869
Estabrook, Joseph H.	Camden, Me.	1854
Estabrook, Theodore S.	Rockland, Me.	1865
†Evans, Asbury	Covington, Ky.	1850
Evans, John	Chicago, Ill.	1849
Evans, John	Havre-de-Grace, Md.	1866
Evans, Otho, Jr.	Franklin, Ohio.	1867
Evans, R. P.	Franklin, Ohio.	1867
Evans, W. R.	Harrodsburg, Ky.	1859
Eve, Joseph A.	Augusta, Ga.	1848
Eve, Paul Fitzimons, V. P.; P.	Nashville, Tenn.	1848
†Everett, S. W. [d. 1862]	Quincy, Ill.	1856
Everitt, E. A.	Burlington, Pa.	1864
Eversfield, Charles	U. S. Navy.	1864
Ewing, Andrew B.	Franklin, Tenn.	1857
Fabyan, George	Boston, Mass.	1860
Fair, Samuel	Columbia, S. C.	1855
Fairbank, Henry Carleton	Flint, Mich.	1869
Falconer, Cyrus	Hamilton, Ohio,	1867
Farrington, J. O.	New York, N. Y.	1864

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Farnham, Horace P.	New York, N. Y.	1864
Farnum, J., Jr.	Salem, Mass.	1853
Fassett, Oscar F.	St. Albans, Vt.	1864
Fay, Allen C.	Milford, Mass.	1855
Fay, Charles M.	Charlton, Mass.	1855
Fay, J. Allen	Milford, Mass.	1868
Fearing, Elisha P.	Nantucket, Mass.	1849
Feay, John	Williamsburg, Pa.	1858
†Fenner, E. D. v. P. [d. 1866]	New Orleans, La.	1851
Fenwick, G. P.	Washington, D. C.	1866
†Ferguson, James [d. 1866]	Glenn's Falls, N. Y.	1864
†Fernald, John S.	Dover, N. H.	1849
Ferre, Henry	Dalton, Mass.	1860
Ferris, O.	Upper Sandusky, Ohio.	1857
Ferris, Samuel	New Westville, Ohio.	1850
Fessenden, C. S. D.	Portland, Me.	1853
Field, A. G.	Des Moines, Iowa.	1867
Field, C. C.	Leominster, Mass.	1864
Field, Philip S.	Baltimore, Md.	1858
Field, Samuel B.	Columbia, Ky.	1859
Finch, C. M.	Portsmouth, Ohio.	1868
Finlay, Ed. Shiel	New York, N. Y.	1867
Findley, Wm. Martin	Altoona, Pa.	1869
Findley, W. R.	Altoona, Pa.	1855
Finnell, Thomas C.	New York, N. Y.	1855
Finney, John M.	Chinchoide, Md.	1868
Fischer, Emil	Philadelphia, Pa.	1868
Fish, Augustine H.	Philadelphia, Pa.	1858
†Fishback, Charles [d. 1861]	Shelbyville, Ind.	1859
Fisher, Alexander	Chicago, Ill.	1863
Fisher, C. H.	North Scituate, R. I.	1858
Fisher, Elias	Richmond, Ind.	1850
Fisher, George J.	Sing Sing, N. Y.	1858
Fisher, John Adams Gideon	New Orleans, La.	1869
Fisher, T. D.	Le Roy, Ill.	1863
Fisk, Calvin P.	Fiskdale, Mass.	1853
Fisk, Samuel A.	Northampton, Mass.	1853
Fiske, D. S.	East Brookfield, Mass.	1864
Fitch, Almiron	Delhi, N. Y.	1864
Fitch, George D.	Philadelphia, Pa.	1864
Fitch, Graham N.	Logan's Port, Ky.	1852

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Fitch, Thomas Davis	Chicago, Ill.	1856
Fithian, Enoch	Greenwich, N. J.	1849
Fithian, Joseph	Woodbury, N. J.	1848
†Flagg, Beling	Charleston, S. C.	1851
Fleming, Andrew	Pittsburg, Pa.	1865
Fleming, Jno. T.	Flemingsburg, Ky.	1857
Fletcher, Wm. B.	Indianapolis, Ind.	1865
Flint, Austin, V. P.	New York, N. Y.	1847
Flint, Jr., Austin	New York, N. Y.	1860
Flint, Edward	Leicester, Mass.	1848
Flint, John	Boston, Mass.	1849
Flint, John S.	Roxbury, Mass.	1865
Flint, Joshua B. V. P.	Louisville, Ky.	1850
Fogg, David S.	Dedham, Mass.	1858
Fogg, John S. H.	Boston, Mass.	1865
†Folsom, Levi	New York, N. Y.	1855
Fonerden, John	Baltimore, Md.	1848
Foote, D. E.	Belvidere, Ill.	1858
Foote, H. E.	Cincinnati, Ohio.	1859
Ford, C. M.	Washington, D. C.	1865
Ford, Corydon L.	Brunswick, Me.	1849
Ford, E. R.	Keokuk, Iowa.	1854
Ford, James B.	Norwalk, Ohio.	1860
†Ford, John D. [d. 1867]	Winona, Minn.	1855
Ford, Lewis D.	Augusta, Ga.	1849
Ford, Wm. H.	Charleston, S. C.	1854
Fore, Prior G.	Cincinnati, Ohio.	1850
Forêe, E. D.	O. Bannons, Ky.	1859
Forsyth, James B.	Chelsea, Mass.	1850
Forwood, Wm. Stump	Philadelphia, Pa.	1867
Foster, Joel	New York, N. Y.	1849
Foster, R. C. s.	Nashville, Tenn.	1855
Foster, Thomas A.	Portland, Me.	1865
Foster, S. Conant	New York, N. Y.	1849
†Fountain, E. J. [d. 1862]	Davenport, Iowa.	1860
Fournier, Edmund Henry	Mobile, Ala.	1869
†Fowler, Ezekiel [d. 1863]	Woonsocket Falls, R. I.	1848
Fowler, Remus M.	Washington, Conn.	1848
Fox, Eli	German Flats, N. Y.	1864
Fox, George	Torresdale, Pa.	1847
Fox, G. M.	Lyons, Ill.	1863

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Fox, W. R.	Wilmington, Ill.	1863
†Francis, E. C. [d. 1856]	Keokuk, Iowa.	1856
Francis, D. P.	New London, Conn.	1856
†Francis, John W. [d. 1861]	New York, N. Y.	1847
Francis, T. E.	Brookline, Mass.	1865
Frankel, Julius	New York, N. Y.	1864
Frazer, E. S.	St. Louis, Mo.	1857
Freeman, D. L.	Floydsburg, Ky.	1853
Freer, James W.	Chicago, Ill.	1855
French, Jno. O.	Hanover, Mass.	1854
French, Leonard C.	Manchester, N. H.	1865
French, S. B.	Battle Creek, Mich.	1856
French, S. H.	Lisle, N. Y.	1854
French, Wm. F.	Paper Mill Village, N. H.	1865
†Frick Charles [d. 1860]	Baltimore, Md.	1855
†Fries, George [d. 1866]	Cincinnati, Ohio.	1850
Frissell, John	Wheeling, West Va.	1850
†Fronefield, Charles	Philadelphia, Pa.	1849
†Frost, Henry R. V. P. [d.1866]	Charleston, S. C.	1849
Frye, Joseph C.	Peoria, Ill.	1847
Frye, Thomas	Rockland, Me.	1858
Fuller, A. J.	Bath, Me.	1854
Furman, Guido, S.	New York, N. Y.	1863
Fyffe, E. P.	Urbana, Ohio.	1858
Gadbury, Wm. Young	Yazoo City, Miss.	1869
Gage, Charles P.	Concord, N. H.	1848
Gage, Daniel P.	Lowell, Mass.	1865
Gage, Thomas H.	Worcester, Mass.	1865
Gaillard, Edwin Samuel	Louisville, Ky.	1869
†Gaillard, Peter Cordes	Charleston, S. C.	1848
Gaines, Edmund Pendleton	Mobile, Ala.	1869
Gaines, R. W.	Hopkinsville, Ky.	1857
†Gallaher, William [d. 1860]	Philadelphia, Pa.	1858
Gallatin, Jr., Thos.	Pittsburg, Pa.	1866
Galloway, Charles Betts	Canton, Miss.	1869
Garcelon, Alonzo	Lewiston, Me.	1853
Gardner, E. C.	Vermont, Ill.	1863
Gardner, Johnson	Providence, R. I.	1860
Gardner, W. H.	Woodsonville, Ky.	1850
Garland, G. W.	Lawrence, Mass.	1853
Garnett, Alexander Y. P.	Washington, D. C.	1852

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Garretson, F.	Baltimore, Md.	1868
Garrish, John Pool	New York, N. Y.	1853
Garrison, Charles	Swedesboro', N. J.	1849
Garrison, Joseph F.	Swedesboro', N. J.	1847
Garvin, J. P.	Augusta, Ga.	1847
Gaston, Alexander K.	Brandywine Manor, Pa.	1853
Gaston, Ephraim	Morristown, Ohio.	1858
Gauntt, Franklin	Burlington, N. J.	1867
Gay, C. C. F.	Buffalo, N. Y.	1863
Gay, George H.	Boston, Mass.	1850
Gaylord, L. Merriman	Sodus, N. Y.	1860
†Gazzam, Joseph P.	Pittsburg, Pa.	1853
Gebhard, Lewis P.	Philadelphia, Pa.	1864
Geddings, E. v. p.	Charleston, S. C.	1851
Gemmill, J. M.	Altoona, Pa.	1855
Gerhard, Wm. W.	Philadelphia, Pa.	1848
Gerwe, F. H. J.	Cincinnati, Ohio.	1867
†Gibbs, Robert W. [d. 1866]	Columbia, S. C.	1857
Gibbon, J. H.	Charlotte, N. C.	1858
Gibbon, Quinton	Salem, N. J.	1847
†Gibson, Charles Bell [d.1865]	Richmond, Va.	1847
Gibson, George S.	Baltimore, Md.	1852
†Gibson, William [d. 1868]	Philadelphia, Pa.	1848
Gilbert, G. C. H.	Portland, Conn.	1860
†Gilbert, David [d. 1868]	Philadelphia, Pa.	1850
Gilbert, J. C.	Perry, Ga.	1851
Gilchrist, R. S.	De Graff, Ohio.	1850
Gilfillan, Wm.	Brooklyn, N. Y.	1864
Gillet, B.	Springfield, Ohio.	1850
Gillett, Buckland	Franklin, Pa.	1869
Gillette, Walter R.	New York, N. Y.	1868
Gillmore, W. J.	Morehead, Pa.	1867
†Gilman, Chandler R.[d. 1866]	New York, N. Y.	1847
Gilman, Judson	Baltimore, Md.	1855
Gilpin, W. E.	Louisville, Ky.	1859
Given, R. A.	Media, Pa.	1855
Givins, Hugh L.	Lagrange, Ky.	1859
Glennan, Patrick	Washington, D. C.	1868
Gobrecht, Wm. H.	Cincinnati, Ohio.	1858
Goddard, J. W.	Urbana, Ohio.	1867
†Goddard, Paul Beck [d. 1866]	Philadelphia, Pa.	1855

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Godding, Alvah	Winchendon, Mass.	1860
Golden, Walter S.	St. Louis, Mo.	1854
Goldsborough, Henry T.	Easton, Md.	1853
Goldsmith, Middleton	Louisville, Ky.	1859
Gomez, Horatio	New York, N. Y.	1858
†Gooch, P. Claiborne, s.	Richmond, Va.	1851
Goodbrake, C.	Clinton, Ill.	1856
Goodel, G. W.	Greenwich, Mass.	1865
Goodell, George	Sykesville, N. J.	1855
Goodrich, Alfred R.	Vernon, Conn.	1860
†Goodsell, Thomas [d. 1864]	Utica, N. Y.	1849
Goodyear, Miles	Cortland, N. Y.	1851
Gordon, Charles	Boston, Mass.	1849
Gordon, G. E.	Georgetown, Ohio.	1867
Gordon, Thomas W.	Georgetown, Ohio.	1853
Gordon, Timothy	Plymouth, Mass.	1849
Gordon, Wm. A.	New Bedford, Mass.	1860
Gore, Joshua	Blooomfield, Ky.	1859
Gorham, Charles	York, Ill.	1863
Gorton, J. C.	Detroit, Mich.	1856
†Gould, Augustus A. [d. 1866]	Boston, Mass.	1849
Gould, Joshua B.	Templeton, Mass.	1865
Gould, True M.	Raymond, N. H.	1865
Gould, William	Buffalo, N. Y.	1860
†Gourdin, Samuel	New Haven, Conn.	1858
Govan, Wm.	Stony Point, N. Y.	1860
Gove, George S.	Whitefield, N. H.	1864
Graff, Milton B.	Cincinnati, Ohio.	1865
†Grafton, Thomas J.	Rodney, Miss.	1854
Graham, James	Cincinnati, Ohio.	1859
†Graham, J. N.	Chicago, Ill.	1859
Graves, John W.	Chelsea, Mass.	1847
Graves, Josiah G.	Nashua, N. H.	1848
Gray, Alfred	Flemington, N. J.	1864
Gray, F. H.	Boston, Mass.	1865
Gray, Henry C.	North White Creek, N. Y.	1847
Grant, Gabriel	Newark, N. J.	1858
Grant, George R.	Memphis, Tenn.	1857
†Grant, Wm. R. [d. 1852]	Philadelphia, Pa.	1848
Green, Caleb	Homer, N. Y.	1853
Green, Francis C.	E. Hampton, Mass.	1860

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†Green, Horace [d. 1866]	New York, N. Y.	1847
†Green, Isaac [d. 1864]	New York, N. Y.	1847
Green, James M.	Philadelphia, Pa.	1855
Green, James N.	Macon, Ga.	1851
†Green, John, v. p.	Worcester, Mass.	1848
Green, John N.	Stilesville, Ind.	1859
Green, John O.	Lowell, Mass.	1858
Green, Tobias J.	Parrish, N. Y.	1864
Green, Traill	Easton, Pa.	1853
Greene, James S.	Dorchester, Mass.	1865
Greene, M. L.	Pontiac, Mich.	1865
Greene, M. C.	Boston, Mass.	1865
Greene, Wm. Warren	Pittsfield, Mass.	1864
Greenleaf, Chas. R.	U. S. Army.	1867
Gregg, Patrick	Rock Island, Ill.	1856
Gregg, S. S.	Ft. Wayne, Ind.	1867
†Gries, William [d. 1851]	Reading, Pa.	1855
†Grieves, H. G.	Cambridge, Md.	1858
Griffin, Hamilton	Louisville, Ky.	1867
Griffiths, Amos W.	Philadelphia, Pa.	1866
Griggs, O. B.	Mansfield, Conn.	1860
Grimshaw, Arthur H.	Wilmington, Del.	1849
Griscom, John H.	New York, N. Y.	1847
Griswold, L. D.	Elyria, Ohio.	1856
Griswold, Wayne	Circleville, Ohio.	1867
Groesbeck, Abraham	Chicago, Ill.	1869
Gronard, John Hanson	Alleghany City, Pa.	1869
Gross, Augustus	East Liberty, Pa.	1866
Gross, Augustus H.	East Liberty, Pa.	1866
Gross, Samuel D.	Philadelphia, Pa.	1850
Grove, J. H.	Philadelphia, Pa.	1867
Grubbs, Thomas H.	Russellville, Ky.	1858
Gruel, Louis	Philadelphia, Pa.	1868
Grice, Napoleon Lorenzo	Fayette, Miss.	1869
Guilford, Wm.	Lebanon, Pa.	1855
Guleke, Hermann	New York, N. Y.	1864
Gundry, Richard	Dayton, Ohio.	1856
Gunn, Moses	Detroit, Mich.	1856
Hadley, Edwin	Richmond, Ind.	1867
Hadley, George	Buffalo, N. Y.	1849

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Haggard, W. D.	Gallatin, Tenn.	1854
Hagner, Daniel R.	Washington, D. C.	1858
Haight, C. W.	Pleasantville, N. Y.	1860
Haile, Ashbel B.	Norwich, Conn.	1849
†Halberstadt, George	Pottsville, Pa.	1855
†Hale, Enoch [d. 1848]	Boston, Mass.	1848
Hale, Josiah	Owensboro, Ky.	1869
Hall, Adino B.	Boston, Mass.	1860
†Hall, Charles	Burlington, Vt.	1847
Hall, D. G.	Dunkirk, N. Y.	1867
Hall, Edward	Auburn, N. Y.	1860
†Hall, Eli	East Hartford, Conn.	1849
Hall, George W.	Carthage, Ill.	1857
Hall, James C.	Washington, D. C.	1855
Hall, J. Z.	St. Louis, Mo.	1867
Hall, Newton B.	Branford, Conn.	1865
Hall, W. C.	Fayetteville, Ohio.	1863
Haller, F. B.	Vandalia, Ill.	1859
†Hallowell, Edward	Philadelphia, Pa.	1849
Halsey, Calvin C.	Montrose, Pa.	1864
Halsey, W. S.	Philadelphia, Pa.	1858
Halstead, Thaddeus M.	New York, N. Y.	1847
Ham, Levi J.	South Bend, Ind.	1866
Hamill, R. C.	Chicago, Ill.	1863
†Hamilton, Cyrus B.	Lyme, N. H.	1849
Hamilton, Frank H.	New York, N. Y.	1848
Hamilton, Horace	National, Iowa.	1865
Hamilton, Joseph Ormond	Jerseyville, Ill.	1867
Hamilton, J. W.	Columbus, Ohio.	1864
Hamilton, Wm. N.	Cantwell's Bridge, Del.	1847
Hamilton, Wm. R.	Peoria, Ill.	1850
Hammer, A.	St. Louis, Mo.	1867
Hammond, Justin	Daysville, Conn.	1848
†Hampton, Isaac H.	Bridgeton, N. J.	1855
†Hancock, F. W. [d. 1865]	Richmond, Va.	1852
Hand, D. W.	St. Paul, Minn.	1860
†Handy, John H. [d. 1853]	Philadelphia, Pa.	1848
†Handy, Samuel K. [d. 1859]	Princess Anne, Md.	1848
Hansman, Theodore	Washington, D. C.	1868
Happolt, C.	Morganton, N. C.	1855
Hard, A.	Aurora, Ill.	1858

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Hard, Chester	Ottawa, Ill.	1856
Hardcastle, Edward M.	Trappe, Md.	1853
Hardin, John	Louisville, Ky.	1859
Harding, Abraham	South Hero, Vt.	1865
Harding, M. H.	Lawrenceburg, Ind.	1859
Hargraves, James Theophilus	Florence, Ala.	1850
Harlan, David, U. S. N.	Churchville, Md.	1866
Harlow, E. A. W.	Boston, Mass.	1865
Harlow, James F.	Boston, Mass.	1865
Harlow, J. M.	Woburn, Mass.	1865
†Harpur, John	Sandwich, Mass.	1849
†Harriman, H. C. [d. 1863]	Jerseyville, Ill.	1856
Harriman, S. B.	Richmond, Ind.	1867
Harrington, S. H.	Chenango Forks, N. Y.	1858
Harrington, William C.	Payson, Ill.	1854
Harrington, Z. G.	Chester, Vt.	1865
†Harris, Chapin A.	Baltimore, Md.	1848
Harris, Edward M.	Providence, R. I.	1868
Harris, Elisha	New York, N. Y.	1853
Harris, Jonas C.	Arlington, Mass.	1860
Harris, Juriah	Savannah, Ga.	1852
Harris, Nathan C.	Auburn, Me.	1860
†Harrison, David	Middletown, Conn.	1855
Harrison, E. J.	Cartersville, Va.	1852
Harrison, F. C.	Lewisburg, Pa.	1860
†Harrison, J.	New Orleans, La.	1847
†Harrison, Jno. Pollard, V. P. [d. 1848]	Cincinnati, Ohio.	1848
Harry, Samuel H.	Doe Run, Pa.	1848
†Harry, Samuel M. [d. 1868]	Bayview, Md.	1866
Hart, Alexander C.	Philadelphia, Pa.	1847
Hart, Frederick A.	Southington, Conn.	1865
†Hart, John [d. 1867]	New York, N. Y.	1849
Hart, Samuel	Brooklyn, N. Y.	1849
Hartman, Andrew	Baltimore, Md.	1866
Hartshorne, Edward	Philadelphia, Pa.	1853
Hartshorne, Henry	Philadelphia, Pa.	1855
Hartt, Henry Le Baron	New York, N. Y.	1865
Harvey, Charles W.	Buffalo, N. Y.	1849
Harvey, Leon F.	Buffalo, N. Y.	1864
Harvey, O.	Placerville, Cal.	1858

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Harvey, Thos. B.	Indianapolis, Ind.	1867
Hasbrouck, Charles	Hackensack, N. J.	1866
Haskell, Benjamin	Rockport, Mass.	1849
†Haskins, E. B. [d. 1868]	Nashville, Tenn.	1850
Hastings, Panet M.	Hartford, Conn.	1860
Hatch, Ira	Chicago, Ill.	1863
†Hatch, Johnson C.	Kent, Conn.	1847
Hatfield, Nathan	Philadelphia, Pa.	1866
Hatfield, Nathan L.	Philadelphia, Pa.	1848
Haughton, R. E.	Richmond, Ind.	1859
Haven, Jonathan	Newton, N. J.	1865
Haven, Samuel R.	Chicago, Ill.	1852
Hawley, George B.	Hartford, Conn.	1860
†Hawley, Joel Edwin [d. 1859]	Ithaca, N. Y.	1849
Hawley, Roswell	Bristol, Conn.	1853
Haxall, Robert W.	Richmond, Va.	1847
Hay, Gustavus	Boston, Mass.	1865
Hay, Thomas	Philadelphia, Pa.	1866
Hay, Walter	Chicago, Ill.	1863
Hayes, Joseph Byron	Canandaigua, N. Y.	1865
Haymond, R.	Brookville, Ind.	1850
Haynes, Timothy	Concord, N. H.	1849
Hays, Isaac, T.	Philadelphia, Pa.	1847
Hays, W.	Covington, Ky.	1859
Hayward, E. Darwin	Columbus, N. Y.	1865
†Hayward, Geo. V. P. [d. 1863]	Boston, Mass.	1849
Hayward, George, Jr.	Boston, Mass.	1849
Haze, W. H.	Farmington, Mich.	1856
†Hazell, Andrew	All Saints, S. C.	1851
Hazeltine, G. W.	Jamestown, N. Y.	1867
Hazen, Edward	Woodstock, Vt.	1865
Hazen, Miner C.	Haddam, Conn.	1864
Heard, Thos. Jefferson	Galveston, Texas.	1867
Heaton, Carleton R.	Maine, N. Y.	1865
Heger, Anthony	Pottsville, Pa.	1853
Heighway, Archibald E.	Cincinnati, Ohio.	1858
Heinstreet, Thos. Brinsmade	Troy, N. Y.	1868
†Heintze, F. E. B. V. P. [d. '65]	Baltimore, Md.	1848
†Heister, J. P.	Reading, Pa.	1852
†Hellen, B. Johnson [d. 1864]	Washington, D. C.	1855
Helmick, Joseph	Harrisburg, Ohio.	1859

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†Helmsley, W.	Caroline Co., Md.	1848
Helsby, Thos. H.	Baltimore, Md.	1866
Henderson, Eugene	Murfreesboro', Tenn.	1858
Henderson, E. R.	Blue House P. O., S. C.	1857
Henderson, F. B.	Whitesboro', N. Y.	1860
Henderson, J. P.	Newville, Ohio.	1856
Henderson, Wm. Warton	Covington, Ky.	1869
Hendrick, H. C.	McGrawville, N. Y.	1860
Hendry, Charles D.	Camden Co., N. J.	1849
Henrigues, A. J.	New York, N. Y.	1864
Henry, James H.	Brooklyn, N. Y.	1849
Henschel, Charles	New York, N. Y.	1853
Herbst, William	Reading, Pa.	1856
Hereford, Francis Mason	Montgomery, Ala.	1869
†Herrick, Josiah B. [d. 1849]	Vandalia, Ill.	1848
Herrick, Stephen Solon	New Orleans, La.	1869
†Herrick, W. B. [d. 1865]	Chicago, Ill.	1854
Hersey, A. L.	Oxford, Me.	1865
Heterick, A. B.	Georgetown, Ohio.	1850
Heustis, James Fountain	Mobile, Ala.	1869
Hewins, L. T.	Loda, Ill.	1865
Hewit, R. C.	Louisville, Ky.	1859
Hewitt, Chas. Nathaniel	Redwing, Minn.	1869
Hewson, Addinell	Philadelphia, Pa.	1855
Heydock, M. O.	Chicago, Ill.	1863
Heywood, Benjamin F.	Worcester, Mass.	1853
Heywood, C. F.	New York, N. Y.	1858
Hibberd, James Farquhar, V. P.	Richmond, Ind.	1864
Hickman, Thos. Gideon	Vandalia, Ill.	1869
†Hiester, Frank M. [d. 1864]	Reading, Pa.	1853
Higday, T.	Laporte, Ind.	1863
Higginson, Francis J.	Brattleboro', Vt.	1849
Hildreth, Chas. C.	Zanesville, Ohio.	1867
Hildreth, E. A.	Wheeling, West Va.	1850
Hildreth, Joseph S.	Chicago, Ill.	1867
Hill, Edwin A.	East Killingly, Conn.	1864
Hill, E. L.	Oxford, Ohio.	1867
Hill, Hiram H.	Augusta, Me.	1860
Hill, Levi G.	Dover, N. H.	1849
Hill, L. S.	Neville, Ohio.	1867
Hillis, Wm. A.	Hillsboro', Ill.	1857

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Hinkle, John M.	Carlisle, Ind.	1859
Hinsey, Joseph C.	Pekin, Ill.	1854
Hinton, John H.	New York, N. Y.	1860
Hirons, R. S. W.	Smyrna, Del.	1864
Hitchcock, Alfred	Fitchburg, Mass.	1849
Hitchcock, Homer O.	Kalamazoo, Mich.	1863
Hitchcock, Horatio	Chicago, Ill.	1863
Hitchcock, J. G. S.	Foxboro', Mass.	1865
Hitt, Willis W.	Vincennes, Ind.	1854
Hobbs, J. C. H.	Galena, Ill.	1857
Hodgden, John F.	St. Louis, Mo.	1867
Hodgdon, Richard L.	West Cambridge, Mass.	1860
Hodge, Hugh L.	Philadelphia, Pa.	1848
Hodge, J. A.	Henderson, Ky.	1859
Hodgson, G. W.	White Plains, N. Y.	1864
†Hofey, Thomas [d. 1853]	Columbus, Ga.	1853
Holbrook, J. E.	Charleston, S. C.	1851
Holcomb, William Frederic	New York, N. Y.	1858
Holden, Edgar	Newark, N. J.	1866
Hollester, J. H.	Chicago, Ill.	1856
Hollingsworth, Samuel L.	Philadelphia, Pa.	1855
Hollingsworth, W. T.	Buckhead, Ga.	1858
Holmes, Christopher C.	Milton, Mass.	1853
†Holmes, Daniel [d. 1869]	Elmira, N. Y.	1863
Holmes, E. L.	Chicago, Ill.	1863
Holmes, Job	Calais, Me.	1858
Holmes, Oliver Wendell	Boston, Mass.	1847
Holloway, Jas. Montgomery	Louisville, Ky.	1869
Holston, John G. F.	Zanesville, Ohio.	1855
Holt, W. D.	Covington, Ky.	1850
Holton, Henry D.	Putney, Vt.	1864
Homans, Charles D.	Boston, Mass.	1853
†Homans, John [d. 1868]	Boston, Mass.	1849
†Hook, J. H. [d. 1861]	St. Matthew's, S. C.	1851
Hooker, Anson	East Cambridge, Mass.	1855
Hooker, Anson P.	East Cambridge, Mass.	1860
†Hooker, Charles [d. 1863]	New Haven, Conn.	1850
†Hooker, Worth'gton [d. 1868]	New Haven, Conn.	1849
Hooper, Foster	Fall River, Mass.	1849
Hooper, F. H.	New Bedford, Mass.	1863
Hooper, Robert W.	Boston, Mass.	1849

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†Hopkins, Joel [d. 1868]	Howard Co., Md.	1847
Hopkins, Thos. C.	Havre-de-Grace, Md.	1867
Hopson, H.	Paris, Ky.	1859
Horlbeck, Elias	Charleston, S. C.	1851
Horlbeck, W. C.	Charleston, S. C.	1855
Horner, G. R. B.	United States Navy.	1855
†Horner, Wm. E. [d. 1853]	Philadelphia, Pa.	1849
Horton, George F.	Terrytown, Pa.	1858
Hosmer, Alfred	Watertown, Mass.	1865
†Hosmer, Hiram	Watertown, Mass.	1849
Houck, J. W.	Baltimore, Md.	1858
Hovey, B. L.	Dansville, N. Y.	1858
Hovey, Daniel	Greensfield, Mass.	1853
Howard, Benj.	New York, N. Y.	1867
Howard, Flodoardo	Washington, D. C.	1847
Howard, Henry	University of Virginia, Va.	1848
Howard, Levi	Chelmsford, Mass.	1855
†Howard, Richard L. v. p.	Columbus, Ohio.	1848
Howe, Appleton	South Weymouth, Mass.	1852
Howe, Charles	Taunton, Mass.	1860
†Howe, Zadoc	Billerica, Mass.	1849
Hoyt, Enos	Framingham, Mass.	1849
Hoyte, James W.	Nashville, Tenn.	1857
Hubbard, Dennison H.	Clinton, Conn.	1858
Hubbard, Oliver P.	Hanover, N. H.	1860
Hubbard, Robert	Bridgeport, Conn.	1853
Hubbard, Samuel T.	New York, N. Y.	1847
Hubbard, Stephen G. s.	New Haven, Conn.	1849
Huestis, Isaac	Chester Hill, Ohio.	1856
Hughes, Edward Wm.	Granada, Miss.	1869
Hughes, Francis Marion	Nashville, Tenn.	1869
Hughes, J. C.	Keokuk, Iowa.	1853
Hulbert, C. M.	St. Dennis, Mass.	1865
Hume, S. T.	Genesee, Ill.	1863
†Humes, Samuel [d. 1853]	Lancaster, Pa.	1848
Humphries, Lewis	South Bend, Indiana.	1856
Hun, Thomas	Albany, N. Y.	1853
†Hunkins, Seth C.	Windham, Maine.	1860
Hunt, Ebenezer	Davenport, Mass.	1849
Hunt, Ebenezer K.	Hartford, Conn.	1860
Hunt, Ezra M.	Metuchen, N. J.	1864

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Hunt, Jacob	Utica, N. Y.	1865
Hunt, Sandford B.	Buffalo, N. Y.	1855
Hunt, Thomas Edgar	Clarksville, N. J.	1848
Hunt, Samuel P.	Morrow, Ohio.	1850
Hunt, William	Philadelphia, Pa.	1859
Hunter, Charles H.	Reading, Pa.	1858
†Huntington, Elisha	Lowell, Mass.	1847
Huntington, W. M.	Rochester, Vt.	1863
Hupp, John Cox	Wheeling, West Va.	1863
Hurd, Henry Sterling	Galesburg, Ill.	1860
Hurd, Samuel H.	Charlestown, Mass.	1860
Hurd, Yorick G.	Amesbury, Mass.	1865
Hurlbut, H. N.	Chicago, Ill.	1863
Hurlbut, V. L.	Chicago, Ill.	1863
†Hurxthal, Fred. T. [d. 1863]	Massillon, Ohio.	1856
†Huse, Stephen	Methuen, Mass.	1855
Husted, Nathaniel C.	New York, N. Y.	1856
†Huston, Robert M.	Philadelphia, Pa.	1848
Hutchins, Samuel	West Killingly, Conn.	1853
Hutchinson, David	Mooresville, Ind.	1856
Hutchinson, Ira	Cromwell, Conn.	1855
Hutchinson, James Howell	Philadelphia, Pa.	1864
Hutchison, Joseph C.	Brooklyn, N. Y.	1855
†Huxley, A. M. [d. 1864]	Goshen, Conn.	1853
Hyde, Frederick	Cortlandville, N. Y.	1847
Hyde, George S.	Boston, Mass.	1865
Iles, Thomas J.	Davenport, Iowa.	1864
Ingals, William	Winchester, Mass.	1860
Inglis, R.	Detroit, Mich.	1856
Ingraham, T. M.	Flatbush, N. Y.	1856
Inloes, Henry A.	Baltimore, Md.	1858
Innes, Charles	Easton, Pa.	1853
Ireland, J. A.	Louisville, Ky.	1867
Irwin, J. S.	Marion, N. C.	1851
Isham, Ralph N.	Chicago, Ill.	1859
Isom, Thos. Dudley	Oxford, Miss.	1869
Ives, Charles L.	New Haven, Conn.	1865
†Ives, Eli, S.; P. [d. 1861]	New Haven, Conn.	1847
Ives, Levi	New Haven, Conn.	1860
Ives, Nathan B.	New Haven, Conn.	1847

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Jackson, Charles T.	Boston, Mass.	1852
†Jackson, James [d. 1867]	Boston, Mass.	1849
Jackson, James C.	Hartford, Conn.	1865
Jackson, J. B. S.	Boston, Mass.	1849
Jackson, John Davies	Danville, Ky.	1867
Jackson, J. E.	Fallston, Pa.	1868
†Jackson, R. M. S. [d. 1865]	Cresson, Pa.	1855
Jackson, Samuel (Prof.)	Philadelphia, Pa.	1847
Jackson, Samuel	Philadelphia, Pa.	1847
Jackson, Samuel	U. S. Navy.	1865
Jackson, Thomas	Binghampton, N. Y.	1855
Jackson, William H.	New York, N. Y.	1852
Jacobi, Abraham	New York, N. Y.	1860
Jacobs, Ferris	Delhi, N. Y.	1853
James, Charles	Easton, Pa.	1855
James, O. P.	Doylestown, Pa.	1856
†Jameson, Horatio G., Sen.	Baltimore, Md.	1848
Janes, Edward H.	New York, N. Y.	1860
Janeway, J. H.	Princeton, N. J.	1858
†Janney, Benj. Say [d. 1859]	Philadelphia, Pa.	1847
Jarvis, Edward	Dorchester, Mass.	1849
Jarvis, George O.	Portland, Conn.	1849
Jarvis, John F.	Boston, Mass.	1865
†Jarvis, N. S.	U. S. Army.	1853
Jarvis, Samuel G.	Claremont, N. H.	1864
Jeffries, John	Boston, Mass.	1847
Jenckes, George W.	Cumberland, R. I.	1865
Jenkins, J. Foster	Yonkers, N. Y.	1853
†Jenkins, Solomon M. [d. '49]	Easton, Md.	1847
Jenks, Edward Watrous	Detroit, Mich.	1863
Jennings, Ellis	Dayton, Ohio.	1867
Jennings, Roscoe Greene	Little Rock, Ark.	1869
†Jennings, Selden	Richmond, Mass.	1848
Jennings, Thomas R.	Nashville, Tenn.	1857
Jennis, Samuel	New Castle, Ind.	1863
Jerome, James H.	Trumansburg, N. Y.	1848
Jervey, James P.	Charleston, S. C.	1847
Jessup, D. H.	Covington, Ky.	1859
Jewell, Wilson, V. P. [d. 1868]	Philadelphia, Pa.	1847
Jewett, Charles C.	Holliston, Mass.	1865
Jewett, George	Fitchburg, Mass.	1865

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Jewett, Harvey	Canandaigua, N. Y.	1848
Jewett, H. A.	Northboro', Mass.	1865
Jewett, Jeremiah P.	Lowell, Mass.	1849
Jewett, Theodore H.	South Berwick, Me.	1865
Jewitt, Pliny A.	New Haven, Conn.	1848
Jobs, Eugene	Springfield, N. J.	1858
†Johnson, Carter P.	Richmond, Va.	1847
†Johnson, Charles	York, Ill.	1859
Johnson, George	St. Louis, Mo.	1854
Johnson, Hosmer A., S.	Chicago, Ill.	1853
Johnson, James	Hicksford, Va.	1852
Johnson, John B., V. P.	St. Louis, Mo.	1847
Johnson, John C.	Blairstown, N. J.	1860
Johnson, Joe Henry	Talladega, Ala.	1868
Johnson, J. L. C.	Clarksville, Tenn.	1854
Johnson, Joseph Taber	Washington, D. C.	1868
Johnson, M. J.	Wilmington, Ill.	1863
Johnson, Nathan	Cambridge City, Ind.	1850
Johnson, R. P.	Wilmington, Del.	1858
Johnson, Wm. John	Chicago, Ill.	1869
Johnson, Wm. Otis	Boston, Mass.	1865
Johnston, Alexander M.	Cincinnati, Ohio.	1855
Johnston, Christopher	Baltimore, Md.	1855
Johnston, J. C.	Louisville, Ky.	1855
Johnston, Wm. P., V. P.	Washington, D. C.	1848
Jones, A. B.	Portsmouth, Ohio.	1868
Jones, Benjamin	Montgomery, Ala.	1849
Jones, Charles H.	Baltimore, Md.	1866
Jones, Charles W.	Wilmington, Del.	1866
†Jones, Daniel T. [d. 1861]	Baldwinsville, N. Y.	1852
Jones, D. M.	Corydon, Ind.	1859
Jones, Eusebius Lee	New York, N. Y.	1858
Jones, George Stevens	Boston, Mass.	1865
Jones, Henry N.	Kingston, Mass.	1865
Jones, H. Webster	Chicago, Ill.	1863
Jones, James	New Orleans, La.	1849
Jones, J. B.	Chapel Hill, N. C.	1851
Jones, John E.	Cincinnati, Ohio.	1867
Jones, Joseph	New Orleans, La.	1859
Jones, Joseph B.	Brooklyn, N. Y.	1860
Jones, Joseph S.	Boston, Mass.	1865

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Jones, Samuel J.	Chicago, Ill.	1868
Jones, W.	Vernon, Del.	1855
†Jones, Wm. [d. 1867]	Washington, D. C.	1858
Jones, Wm.	Kenton, Ohio.	1867
Jones, William P.	Nashville, Tenn.	1857
Jones, W. S.	Augusta, Ga.	1858
Jones, W. W.	Toledo, Ohio.	1856
Joynes, Levin S.	Richmond, Va.	1847
Judd, Homer	St. Louis, Mo.	1869
Judkins, David	Cincinnati, Ohio.	1847
Judkins, Jesse P.	Cincinnati, Ohio.	1850
†Judkins, William	Cincinnati, Ohio.	1848
Jump, Isaac	Dover, Del.	1848
Kearney, F. H.	Cincinnati, Ohio.	1867
Kearns, Chas.	Covington, Ky.	1867
Keating, William V.	Philadelphia, Pa.	1853
Keep, N. C.	Boston, Mass.	1853
Keirn, G.	Lexington, Miss.	1847
Keller, James M.	Memphis, Tenn.	1859
Kelley, Wm. Dennis	Galveston, Texas.	1869
Kells, Robert	Jackson, Miss.	1869
Kelly, P. H.	Waterford, Ohio.	1859
Kemp, A. E.	New Salem, Mass.	1855
Kemp, J. D.	Vandalia, Ohio.	1867
Kemp, William M.	Baltimore, Md.	1858
Kemper, Charles R.	Woodville, Va.	1853
†Kendall, Pierson T.	Clinton, Mass.	1859
Kendrick, Oscar C.	Newburg, Ohio.	1860
Keneagy, Samuel	Strasburg, Pa.	1854
Kennard, Thomas C.	Harmony, Md.	1855
Kennedy, Alfred L.	Philadelphia, Pa.	1853
Kennedy, James	New York, N. Y.	1864
Kennedy, J. G.	Batavia, Ohio.	1867
Kennedy, L. H.	Belleville, Ind.	1859
Kenyon, Job	Providence, R. I.	1860
†Kerfoot, George B.	Lancaster, Pa.	1847
Kerlin, Isaac N.	Media, Pa.	1865
Kerr, James W.	York, Pa.	1848
Ketchum, Benjamin F.	Brattleboro', Vt.	1864
Kibbie, Jared	Port Huron, Mich.	1856

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Kimball, Gilman	Lowell, Mass.	1848
King, Albert F. A.	Washington, D. C.	1866
King, Howard W.	Providence, R. I.	1867
King, James	Pittsburg, Pa.	1866
King, James Stebbins	Natchez, Miss.	1863
King, Joseph	Decatur, Ill.	1854
King, R. H.	Wolfboro', N. H.	1865
Kinlock, R. A.	Charleston, S. C.	1853
Kinnemon, Perry S.	Baltimore, Md.	1853
Kinney, M. C.	Lapeer, Mich.	1856
Kissam, Daniel E.	Brooklyn, N. Y.	1864
†Kissam, R. S.	New York, N. Y.	1847
Kitchen, J. M.	Indianapolis, Ind.	1859
Kittridge, Theodore	Waltham, Mass.	1856
†Klapp, Wm. Henry [d. 1855]	Philadelphia, Pa.	1849
Klein, P.	Detroit, Mich.	1856
Knight, E. A.	Springfield, Vt.	1864
Knight, Henry M.	Salisbury, Conn.	1864
†Knight, Jonathan, V. P.; P. [d. 1864]	New Haven, Conn.	1847
Knight, Luther M.	Franklin, N. H.	1853
Knight, Wm. L.	Philadelphia, Pa.	1858
†Knox, Wm. Morrow	Baumstown, Pa.	1860
Koehler, J. G.	Schuylkill Haven, Pa.	1855
†Koehne, H. F.	Dayton, Ohio.	1857
Kollock, Phineas M.	Savannah, Ga.	1853
Krackowizer, Ernest	New York, N. Y.	1855
Kreider, M. Z.	Lancaster, Ohio.	1848
Kyle, John G.	Xenia, Ohio.	1858
†Lajus, D. Paul	Philadelphia, Pa.	1851
Lair, John A.	Portsmouth, Ohio.	1867
Lake, J. J.	De Witt, Ill.	1863
†Lamb, John F. [d. 1869]	Frankford, Pa.	1851
Lamb, William D.	Lawrence, Mass.	1853
Lambert, Alfred	Springfield, Mass.	1849
Lamme, W. H.	Centreville, Ohio.	1859
Lamson, John A.	Boston, Mass.	1865
Landis, Joseph A.	Philadelphia, Pa.	1866
Landrum, J. D.	Mayfield, Ky.	1859
Lane, E. S.	Sandusky, Ohio.	1850

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†Lang, Edmund	Philadelphia, Pa.	1851
Langdon, Oliver M.	Cincinnati, Ohio,	1850
Langworthy, Owen Palmer	Clinton, La.	1869
Lansing, John V.	Albany, N. Y.	1864
La Roche, Rene	Philadelphia, Pa.	1847
La Roche, C. Percy	Philadelphia, Pa.	1858
Lardner, E. C.	Vermont, Ill.	1863
Latta, Milton M.	Goshen, Ind.	1848
Lattimer, C. C.	Princeton, Ill.	1863
Laudon, D. S.	Brooklyn, N. Y.	1860
Lawrence, Jonathan S.	New York, N. Y.	1853
†Lawson, L. M.	Cincinnati, Ohio.	1850
Lazzell, J. M.	Fairmount, W. Va.	1868
Lea, Isaac	Stapleton, N. Y.	1860
Leach, E.	Owassa, Mich.	1856
Leaming, James R.	New York, N. Y.	1865
†Leavenworth, Melinus C.	Waterbury, Conn.	1860
Lebby, Robert	Charleston, S. C.	1849
†Le Boutillier, Charles W.	St. Anthony, Minn.	1856
Lecklider, L. G.	Ansonia, Ohio.	1859
Lee, Benjamin	Philadelphia, Pa.	1868
Lee, Charles Alfred	Peekskill, N. Y.	1847
Lee, George	Leesburg, Va.	1852
†Lee, James [d. 1866]	Mechanicsville, N. Y.	1864
Lee, William	Washington, D. C.	1866
Leedy, J. K.	Warsaw, Ind.	1850
Leete, Albert E.	Romeo, Mich.	1856
Le Hardy, J. C.	Savannah, Ga.	1857
†Leib, Henry F. [d. 1856]	Philadelphia, Pa.	1848
Leidy, Joseph	Philadelphia, Pa.	1854
Leigh, H. G.	Petersburg, Va.	1858
Leighton, Usher Parsons	Kenton, Ohio.	1859
†Leland, Aaron L. [d. 1858]	Detroit, Mich.	1853
Lemoine, E. S., s.	St. Louis, Mo.	1853
Lenoir, B. B.	Lenoir, Tenn.	1849
Leonard, B. B.	West Liberty, Ohio.	1855
Leonard, Jonathan	Sandwich, Mass.	1849
Leonard, M. Bloomfield	East Boston, Mass.	1856
†Leonard, S. E.	New Albany, Ind.	1850
Leonard, W. Y.	Albion, Ind.	1867
Le Prohon, E. P.	Portland, Me.	1851

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†Letcher, Robert P. [d. 1867]	Henderson, Ky.	1859
Levick, James J.	Philadelphia, Pa.	1864
Levis, M. M.	Philadelphia, Pa.	1858
Lewis, B. S.	De Witt, Ill.	1857
Lewis, Clarence Linen	Nashville, Tenn.	1869
Lewis, Fred. W.	Philadelphia, Pa.	1868
Lewis, John B.	Vernon, Conn.	1858
Lewis, John T.	Carrollton, Ky.	1867
Lewis, M. M.	Alexandria, Va.	1858
Lewis, R. S.	Dubuque, Iowa.	1856
Lewis, Samuel	Philadelphia, Pa.	1851
Lewis, T.	Stevensville P. O., Va.	1852
Lewis, Winslow	Boston, Mass.	1855
Lieberman, C. H.	Washington, D. C.	1858
Lilly, Samuel	Lambertville, N. J.	1866
†Lincoln, Isaac [d. 1868]	Brunswick, Me.	1849
Lincoln, John D.	Brunswick, Me.	1865
Lincoln, N. S.	Washington, D. C.	1866
Linderman, R. J.	Quakertown, Pa.	1864
Lindsley, Charles A.	New Haven, Conn.	1855
Lindsley, John Berrien	Nashville, Tenn.	1851
Lindsly, Harvey, P.	Washington, D. C.	1847
Linsly, Jared	New York, N. Y.	1848
Linton, M. L.	St. Louis, Mo.	1854
Linton, S. M.	Columbus, Ind.	1859
Linvill, D. G.	Columbus, Ind.	1867
Lipscomb, Thomas	Shelbyville, Tenn.	1850
Littell, S.	Philadelphia, Pa.	1855
Little, George S.	Kirkwood, N. Y.	1855
Little, James L.	New York, N. Y.	1864
Little, John	Richmond, Va.	1852
†Little, William B. [d. 1867]	San Francisco, Cal.	1860
Livingston, Alfred	Lowell, Mass.	1864
Lockhart, Wilson	Indianapolis, Ind.	1866
Lockwood, John	U. S. Navy.	1848
Lockwood, T. T.	Buffalo, N. Y.	1858
Logan, C. A.	Leavenworth, Kan.	1863
Logan, Joseph P., V. P.	Atlanta, Ga.	1857
Logan, Jos. P.	Baltimore, Md.	1868
Logan, Samuel	New Orleans, La.	1869
Logan, Thomas M.	San Francisco, California.	1865

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Logue, J.	Rural Hill, Tenn.	1857
Lomax, William	Marion, Ind.	1850
Lombard, J. S.	Boston, Mass.	1865
Long, Alfred J.	Whitehall, N. Y.	1864
Long, J. A.	Cantrell Cross Roads, Tenn.	1857
†Long, Samuel [d. 1863]	Springfield, Ill.	1854
Longenecker, J. H.	Feltonville, Mass.	1865
Longstreet, Henry H.	Bordentown, N. J.	1855
Loomis, Alfred Lee	New York, N. Y.	1864
Loomis, Silas L.	Washington, D. C.	1864
Lopez, A., V. P.	New Orleans, La.	1850
Lovell, Ephraim	West Boylston, Mass.	1854
Lovejoy, J. W. H.	Washington, D. C.	1864
Lovejoy, Oliver S.	Haverhill, Mass.	1865
Lowe, John T.	Aberdeen, Miss.	1857
Lowman, John	Johnstown, Pa.	1853
Luce, A. H.	Bloomington, Ill.	1855
†Luden, J. B.	Huntingdon, Pa.	1856
Ludlow, J. L.	Philadelphia, Pa.	1855
Ludlum, Wm. S.	New York, N. Y.	1865
Lumpkin, John G.	Hanover, Va.	1851
Lyman, Elijah S.	Sherburne, N. Y.	1864
Lyman, George H.	Boston, Mass.	1849
†Lyman, Norman [d. 1851]	Warren, Conn.	1849
Lynch, Elijah	Greensville, Ohio.	1867
Lynch, John	Cheraw, S. C.	1851
Lynch, John	New York, N. Y.	1864
Lynde, James P.	Athol, Mass.	1863
†Lyon, G. Gallatin	Jerseyville, Ill.	1867
Lyon, Irving W.	Hartford, Conn.	1864
Lyons, J. E.	Huntingdon, Pa.	1867
Lyons, William B.	Huntington, Ind.	1856
†McAllister, Asa	Ellsworth, Me.	1856
McAllister, John	Chicago, Ill.	1863
McArn, Wm. Torrey	Union Church, Miss.	1869
McArthur, A. L.	Joliet, Ill.	1856
McAvoy, W. B.	Franklin, Ohio.	1867
†McCall, John [d. 1867]	Utica, N. Y.	1847
McCaskey, H.	Batavia, Ohio.	1867
McCaw, James B.	Richmond, Va.	1852

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McClelland, Christopher R.	Brooklyn, N. Y.	1866
McClellan, J. H. B.	Philadelphia, Pa.	1849
McCloskey, Lawrence Aurelius	Mobile, Ala.	1869
McClurg, J. R.	Chandlerville, Pa.	1858
McCollester, J. Q. A.	Groton, Mass.	1865
McCollom, Wm.	Woodstock, Vt.	1864
McConaughy, James	Mt. Pleasant, Pa.	1866
McCord, D. O.	York, Ill.	1859
McCorkle, W. S.	Columbia, Pa.	1852
McCoy, G. R.	Doylestown, Pa.	1864
McCoy, John M.	Bellefonte, Pa.	1847
McCulloch, John	Huntingdon, Pa.	1856
McDaniel, Edward Davis	Camden, Ala.	1869
McDermot, C.	Dayton, Ohio.	1856
McDonald, N.	Pittsburg, Pa.	1868
McDowell, J. J.	St. Louis, Mo.	1867
†McDowell, J. N., V. P. [d. 1868]	St. Louis, Mo.	1854
McDowell, W. J.	Portsmouth, Ohio.	1867
McElbright, Thomas	Akron, Ohio.	1867
McElderry, Henry	Baltimore, Md.	1866
†McElhenny, S. W.	Wheeling, West Va.	1847
McElroy, J. F.	Lebanon, Ky.	1867
†McEwen, John B. [d. 1867]	New York, N. Y.	1860
McFarland, J. A.	Tiffin City, Ohio.	1857
McGavoch, F. Grundy	Shawnee Village, Ark.	1857
†McGill, Geo. M.	Baltimore, Md.	1866
McGregor, Gregor Carmichael	Wesley, Texas.	1869
McGregor John	Thompson, Conn.	1864
†McGugin, D. L.	Keokuk, Iowa.	1854
McGuire, Hugh H., V. P.	Winchester, Va.	1847
McIlvain, William	York, Pa.	1848
McIlvaine, Robert R.	Cincinnati, Ohio.	1850
McIntire, Harvey G.	Concord, N. H.	1866
McIntire, E. S.	Mitchell, Ind.	1867
†McIntyre, Alexander	Palmyra, N. Y.	1852
McKain, Wiley J.	Camden, S. C.	1857
McKay, Lawrence	Rochester, N. Y.	1856
McKee, W. H.	Raleigh, N. C.	1857
McKee, W. L.	Morgantown, N. C.	1857
McKeen, James	Topsham, Me.	1852
McKennon, Thomas	Washington, Pa.	1869

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McKew, Dennis I.	Baltimore, Md.	1858
McKinley, Hays	Kenosha, Wis.	1856
McKim, S. A. H.	Washington, D. C.	1866
McLaren, A. N.	United States Army.	1854
McLean, R. G.	Lockbourne, Ohio.	1867
†McMeens, R. R. [d. 1864]	Sandusky, Ohio.	1856
McMillen, W. L.	Columbus, Ohio.	1858
McMinn, Samuel Norton	Nashville, Tenn.	1869
McMurray, John H.	Independence, Mo.	1854
McNally, Thomas	Chillicothe, Ohio.	1850
McNaughton, James	Albany, N. Y.	1847
†McNevin, Wm. H.	New York, N. Y.	1853
McNulty, John	New York, N. Y.	1856
McNutt, Hiram	Warrensburg, N. Y.	1865
McNutt, J. W.	Kingston, Tenn.	1857
†McPhail, Leonard C. [d. 1867]	Brooklyn, N. Y.	1853
McPheeters, Alexander	Lavonia, Ind.	1859
McPheeters, Wm. Marcellus	St. Louis, Mo.	1850
McReynolds, W. H.	Cincinnati, Ohio.	1867
McRuer, D.	Bangor, Me.	1849
McVey, Richard E.	Waverly, Ill.	1864
Macgill, Charles	Hagerstown, Md.	1865
Mack, H. O.	Shelby, Ohio.	1856
Mack, William	Salem, Mass.	1849
Mackall, Jr., Lewis	Georgetown, D. C.	1865
Mackie, Andrew	New Bedford, Mass.	1849
Mackie, John H.	New Bedford, Mass.	1865
Madden, Z. H.	Clinton, Ill.	1858
Maddin, Thomas L.	Nashville, Tenn.	1857
Magoffin, John	St. Louis, Mo.	1854
Magruder, Hez.	Georgetown, D. C.	1858
Mahon, Ormsby S.	Baltimore, Md.	1854
Malone, H. B.	Gallatin, Tenn.	1857
Malone, T. Stith	Athens, Ala.	1857
Manlove, Joseph Edward	Nashville, Tenn.	1857
†Manly, James R. [d. 1851]	New York, N. Y.	1847
Mann, Benjamin	Roxbury, Mass.	1865
Mansfield, J. D.	South Reading, Mass.	1860
Mansfield, J. R.	New York, N. Y.	1865
Mantle John R.	Vincennes, Ind.	1860
Manwaring, R. A.	New London, Conn.	1860

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Marbury, William	Washington, D.C.	1865
†March, Alden, P. [d. 1869]	Albany, N. Y.	1847
†March, M. M. [d. 1868]	Manlius, N. Y.	1859
Markoe, Thomas M.	New York, N. Y.	1847
†Marsh, Elias J.	Patterson, N. Y.	1847
Marsh, Lebbeus E.	Granby, Mass.	1856
Marshall, J. W. W.	Abbeville C. H., S. C.	1858
Marshall, Jonas A.	Fitchburg, Mass.	1860
Marshall, Nathan S.	West Vincent, Pa.	1866
Marshall, N. B.	Louisville, Ky.	1859
Marshall, Thomas H.	Mason, N. H.	1849
Martin, Charles H.	Allentown, Pa.	1855
Martin, Henry A.	Boston, Mass.	1868
†Martin, Joshua	Xenia, Ohio.	1850
Martin, John A.	Whitemarsh, Pa.	1855
†Martin, Noah	Dover, N. H.	1849
Martin, Oramel	Worcester, Mass.	1856
Martin, Robert	Nashville, Tenn.	1857
Martin, S. K.	Martinsville, N. J.	1856
Martin, S. P.	New Braintree, Mass.	1865
Martin, W. Upton	Richmond, Ky.	1869
Mason, A. H.	Falmouth, Va.	1852
Mason, Augustus	Brighton, Mass.	1865
Mason, Erskine	New York, N. Y.	1868
Mason, E. Hastings	Towanda, Pa.	1863
Mason, George E.	Providence, R. I.	1867
Mason, Theodore L.	Brooklyn, N. Y.	1858
Mason, V. W.	Canastown, N. Y.	1864
Mason, William H.	Buffalo, N. Y.	1864
‡Massie, Hardin	Charlottsville, Va.	1847
Massie, Wm.	Paris, Ill.	1867
Massey, Isaac	West Chester, Pa.	1866
Matchett, J. F.	Brenham, Texas.	1869
†Mathews, Charles H.	Doylestown, Pa.	1849
Matson, A. F.	Loganville, Ohio.	1858
Matthews, H. W. E.	New Haven, Conn.	1855
Matthews, Thomas	Milestown, Md.	1855
Matthewson, Rufus W.	Durham, Conn.	1860
Mattingley, C. P.	Bardstown, Ky.	1857
Mauran, Joseph	Providence, R. I.	1848
Maury, Thos. F.	Washington, D.C.	1866

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Maus, Jos. S.	Perkin, Ill.	1854
Maus, W. S.	Perkin, Ill.	1854
Mauzey, R. D.	Rushville, Ind.	1859
Maxwell, Charles D.	United States Navy.	1858
Maxwell, James D.	Bloomington, Ind.	1859
Mayburry, William	Philadelphia, Pa.	1847
Mayes, J. A.	Maysville, S. C.	1851
Meacbem, John G.	Racine, Wis.	1863
Mead, E.	Cincinnati, Ohio.	1847
Mears, George W.	Indianapolis, Ind.	1850
Meekins, Thomas	Williamsburg, Mass.	1865
†Meigs, Charles D. [d. 1869]	Philadelphia, Pa.	1847
Meigs, James Aitken	Philadelphia, Pa.	1858
Mendenhall, George	Cincinnati, Ohio.	1850
Mendenhall, Isaac	Ashland, Ind.	1857
Mercer, Alfred	Syracuse, N. Y.	1860
Mercer, Jno. R.	Tarboro', N. C.	1851
Meriwether, G.	Line Creek, Ala.	1853
Merrit, John	Middleton, Del.	1855
Messenger, John	New York, N. Y.	1868
Metcalf, John George	Mendon, Mass.	1849
Metcalfe, John T.	New York, N. Y.	1847
Mettauer, J. P.	Prince Edward C. H., Va.	1852
Michel, Middleton	Charleston, S. C.	1853
Michel, Richard Fraser	Montgomery, Ala.	1858
†Middlebrook, Elijah	Trumbull, Conn.	1847
Miles, Francis T.	Charleston, S. C.	1859
Milhau, John	New York, N. Y.	1866
Miller, Alfred	Fitchburg, Mass.	1864
Miller, De Laskie	Chicago, Ill.	1856
Miller, Erasmus D.	Dorchester, Mass.	1853
Miller, Gaylord B.	Harwinton, Conn.	1860
Miller, Henry, P.	Louisville, Ky.	1850
Miller, H. V. W.	Atlanta, Ga.	1868
Miller, Horace G.	Providence, R. I.	1868
†Miller, John [d. 1862]	New York, N. Y.	1853
Miller, J. Leland	Pittsfield, Mass.	1865
Miller, Lewis L.	Providence, R. I.	1849
Miller, Robinson	Mobile, Ala.	1853
Miller, Thomas	Washington, D. C.	1847
†Miller, W. H.	Henderson, Ky.	1859

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Millett, Asa	Bridgewater, Mass.	1865
Mills, Charles S.	Richmond, Va.	1852
Mills, Samuel Blackburn	Louisville, Ky.	1869
Miltenberger, G. W.	Baltimore, Md.	1848
Miner, D. W.	Ware, Mass.	1865
Miner, Julius F.	Buffalo, N. Y.	1864
†Miner, William [d. 1865]	New York, N. Y.	1864
Minor, James M.	Brooklyn, N. Y.	1852
Minot, Francis	Boston, Mass.	1854
†Mitchell, Edward	Edisto, S. C.	1851
Mitchell, G. B.	Keene, N. H.	1868
Mitchell, G. F.	Mansfield, Ohio.	1856
†Mitchell, Henry [d. 1856]	Norwich, N. Y.	1849
†Mitchell, John Kearsly [d.'58]	Philadelphia, Pa.	1847
†Mitchell, James R.	Milford, Del.	1855
Mitchell, J. S.	Charleston, S. C.	1856
Mitchell, L. C.	Brooklyn, N. Y.	1860
†Mitchell, Thomas D. [d. '64]	Philadelphia, Pa.	1847
Mitchell, Wm. Stanton	New Orleans, La.	1869
Mittag, J. F. G.	Lancaster, S. C.	1858
Mixer, S. F.	Buffalo, N. Y.	1850
Mobley, W. W.	Lancasterville, S. C.	1856
Moe, Erastus C.	Groton, N. Y.	1860
Moffett, Jno.	Rushville, Ind.	1859
Moffit, Joseph B.	Mineral Point, Wis.	1867
Monell, Joseph A.	New York, N. Y.	1855
†Monkur, John C. S. [d. 1867]	Baltimore, Md.	1848
Monmonier, John F.	Baltimore, Md.	1855
Monroe, Alex. LeBaron	Medway, Mass.	1855
Monroe, Hollis	Belfast, Me.	1856
Monroe, Nathan P.	Belfast, Me.	1854
Montgomery, F. G.	Hopkinsville, Ky.	1859
Moody, G. A.	Plainville, Conn.	1858
Moody, W. B.	Brownington, Vt.	1865
Moore, Charles B.	Stillwater, N. J.	1858
Moore, Edward B.	Boston, Mass.	1855
Moore, Edw. M.	Rochester, N. Y.	1849
Moore, Enoch W.	Decatur, Ill.	1866
Moore, Jonas Patrick	Yazoo, Miss.	1869
Moore, John S.	St. Louis, Mo.	1852
†Moore, John Wilson [d. 1865]	Philadelphia, Pa.	1847

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Moore, M. S.	Statebury, S. C.	1857
Moore, Richard D.	Athens, Ga.	1851
Moore, Thomas J.	Harrodsburg, Ky.	1853
Moore, W. J.	Norfolk, Va.	1852
Morford, Anthony D.	Newton, N. J.	1853
Morgan, Daniel	Evansville, Ind.	1854
Morgan, Gerard E., s.	Baltimore, Md.	1858
Morgan, Isaiah Dubose	Mobile, Ala.	1869
Morgan, James E.	Washington, D. C.	1848
†Moriarty, John M.	Boston, Mass.	1849
Morland, William W.	Boston, Mass.	1849
Morrill, Samuel	Boston, Mass.	1849
Morris, Casper	Philadelphia, Pa.	1847
Morris, J. Cheston	Philadelphia, Pa.	1858
Morris, John	Baltimore, Md.	1868
Morris, Moreau	New York, N. Y.	1864
†Morris, Philip V. N.	Buskirk's Bridge, N. Y.	1856
Morris, Sidney R.	Philadelphia, Pa.	1868
†Morris, William W.	Dover, Del.	1847
Morse, James R.	North Cambridge, Mass.	1849
Morse, Luther B.	Watertown, Mass.	1850
Morse, Verranus	New York, N. Y.	1867
Morton, John H.	Nashville, Tenn.	1857
Morton, Lloyd	Pawtucket, R. I.	1865
†Morton, Sam'l Geo. [d. 1851]	Philadelphia, Pa.	1847
Morton, Thomas George	Philadelphia, Pa.	1864
Moseley, W. P.	Buckingham, Va.	1852
Moses, Israel	United States Army.	1847
Moses, S. Gratz	St. Louis, Mo.	1854
Mosgrove, James M.	Urbana, Ohio.	1857
Moss, Benjamin Hart	New Orleans, La.	1869
Mosser, David O.	Breinigville, Pa.	1855
Mothershead, F. M.	Indianapolis, Ind.	1859
†Mothershead, I. L.	Indianapolis, Ind.	1850
Mott, Alex. B.	United States Army.	1864
†Mott, Valentine [d. 1865]	New York, N. Y.	1847
Mott, Walter	Schuylerville, N. Y.	1853
Moulton, Peter	New Rochelle, N. Y.	1853
Moultrie, James, V. P.; P.	Charleston, S. C.	1847
†Mount, W. [d. 1865]	Cincinnati, Ohio.	1859
†Mowe, Daniel	Lowell, Mass.	1849

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Mowry, Robert B.	Alleghany City, Pa.	1850
Moxley, M. R.	Wheelersburg, Ohio.	1852
Moxley, N. K.	Ironton, Ohio.	1850
Muhlenberg, F. H.	Lancaster, Pa.	1848
Muhlenberg, Henry E.	Lancaster, Pa.	1849
Mulford, Isaac L.	Camden, N. J.	1855
Mullen, Alexander J.	Napoleon, Ind.	1850
Muller, Gerhard	Lexington, S. C.	1851
†Muller, John R. [d. 1868]	Baltimore, Md.	1866
Mullen, T. J.	New Richmond, Ohio.	1859
†Munn, Jephtha B. [d. 1863]	Chatham, N. J.	1849
Munson, A. W.	Kenton, Ohio.	1856
Murdock, Thomas F.	Baltimore, Md.	1866
Murphy, Andrews	Parkesburg, Pa.	1849
Murphy, Edward	New Harmony, Ind.	1854
Murphy, John	St. Anthony, Minn.	1854
Murphy, John A.	Cincinnati, Ohio.	1863
Murphy, Joseph	Taunton, Mass.	1865
Murrell, T. C.	Winchester, Tenn.	1857
Muscroft, C. S.	Cincinnati, Ohio.	1867
Muse, James A.	Cambridge, Md.	1858
Musgrave, H. B.	Cincinnati, Ohio.	1854
Musgrove, A.	Urbana, Ohio.	1856
Musgrove, James M.	Urbana, Ohio.	1867
Mussey, F. B.	Cincinnati, Ohio.	1850
†Mussey, Reuben D., P. [d. 1865]	Cincinnati, Ohio.	1849
Mussey, Wm. Heberden, V. P.	Cincinnati, Ohio.	1858
†Mütter, Thos. Dent [d. 1859]	Philadelphia, Pa.	1847
Myers, J. G. B.	Washington, N. C.	1852
Myers, Wm. H.	Fort Wayne, Ind.	1865
Nagle, Hiester M.	Reading, Pa.	1868
Nally, Chas. Francis	Washington, D. C.	1869
Nance, Hiram	Kewanee, Ill.	1854
†Naudain, Arnold	Philadelphia, Pa.	1847
Neal, Thomas L.	Dayton, Ohio.	1867
Nebinger, Andrew	Philadelphia, Pa.	1858
Neff, B.	New Carlisle, Ohio.	1856
Neff, John	Baltimore, Md.	1866
Neill, John	Philadelphia, Pa.	1847
Neldon, Charles R.	Newton, N. J.	1868

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New, George W.	Greensburg, Ind.	1859
New, Robert A.	St. Joseph, La.	1857
Newberry, Milton	Whitemarsh, Pa.	1858
Newell, Selim	Lyndon, Vt.	1849
Newell, Timothy	Providence, R. I.	1860
Newhall, Thomas K.	Providence, R. I.	1860
Newland, Benjamin	Bedford, Ind.	1859
†Newman, James M.	Buffalo, N. Y.	1855
Newman, W. G. H.	Washington, D. C.	1868
Newnan, Joseph C.	Nashville, Tenn.	1858
Newton, Homer G.	Brooklyn, N. Y.	1868
Nichell, H.	Buffalo, N. Y.	1863
Nichols, Adams	Quincy, Ill.	1853
Nichols, C. H.	Washington, D. C.	1858
Nichols, George H.	Boston, Mass.	1865
Nichols, Samuel	Bellows' Falls, Vt.	1865
Nichols, Truman	New York, N. Y.	1866
†Nichols, Whitfield	Newark, N. J.	1849
Nicholson, George L.	Middlesex Co., Va.	1852
Nicoll, John	New Haven, Conn.	1855
Niles, H. H.	Post Mills, Vt.	1849
Nims, Dwight	Jackson City, Mich.	1856
Nivison, Nelson	Burdett, N. Y.	1860
Noble, H.	Heyworth, Ill.	1856
Noble, S. W.	Bloomington, Ill.	1855
Noel, H. R.	Baltimore, Md.	1868
Norcross, Josiah	South Reading, Mass.	1858
Norris, George D.	New Market, Ala.	1859
Norris, George W., V. P.	Philadelphia, Pa.	1847
Norris, James Thomas	Brenham, Texas.	1869
North, Alfred	Waterbury, Conn.	1866
North, B. B.	Cornwall, Conn.	1856
North, Nelson Luther	Brooklyn, N. Y.	1864
†Norton, J. C.	Marion, Ohio.	1850
Norton, O. D.	Cincinnati, Ohio.	1855
Norwood, Walter A.	Henderson, Ky.	1850
†Nott, G. A. [d. 1867]	New Orleans, La.	1852
Nottingham, C. B.	Macon, Ga.	1852
Nourse, Amos	Bath, Me.	1860
Noyes, Henry D.	New York, N. Y.	1864
Noyes, Josiah	Needham, Mass.	1853

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Noyes, Samuel S.	New Canaan, Conn.	1855
Nye, Elisha B.	Middletown, Conn.	1855
Nye, James M.	Lynn, Mass.	1849
Oakes, Sylvester	Auburn, Me.	1854
Oakley, L. W.	Elizabeth City, N. J.	1858
†Odin, Jr., John	Boston, Mass.	1849
O'Donnel, D. A.	Baltimore, Md.	1853
†Ogden, Benjamin [d. 1867]	New York, N. Y.	1848
†Ogier, Septimus A. [d. 1851]	Frazer, Pa.	1853
Ogier, T. L.	Charleston, S. C.	1851
Ogilby, Hugh J.	Madison, Ga.	1849
Ohr, G. H.	Cumberland, Md.	1868
Oliver, Abner McCarty	Montgomery, Ala.	1869
Oliver, Fitch E.	Boston, Mass.	1860
Orcutt, Almon M.	Hardwick, Mass.	1860
Ordronaux, John	Roslyn, N. Y.	1864
Ordway, John P.	Boston, Mass.	1865
O'Reilly, D. J.	Louisville, Ky.	1859
Ormiston, Robert	Brooklyn, N. Y.	1864
Orton, John Gay	Binghampton, N. Y.	1855
Osborn, Thos. Childress	Greensboro', Ala.	1869
Osgood, Jonathan W. D.	Greenfield, Mass.	1853
Osler, Owen	Philadelphia, Pa.	1858
Otterson, Andrew	Brooklyn, N. Y.	1853
Owen, Pascal Harrison	Montgomery, Ala.	1869
Owen, W. O.	Lynchburg, Va.	1868
Owings, John H.	Roxbury, Md.	1866
Packard, John H.	Philadelphia, Pa.	1860
Paddock, Lewis S.	Norwich, Conn.	1860
Paddock, S. A.	Princeton, Ill.	1854
†Padelford, George P. [d. 1861]	Savannah, Ga.	1857
Page, Alpheus F.	Bucksport, Me.	1854
Page, Calvin G.	Boston, Mass.	1860
Page, Horatio N.	Chelsea, Mass.	1854
Page, R. H.	Columbus, N. J.	1858
Page, W. H.	Boston, Mass.	1853
Paine, Ezra	Montpelier, Vt.	1865
Pallen, Montrose A.	St. Louis, Mo.	1858
Palmer, Alonzo Benjamin, V. P.	Ann Arbor, Mich.	1850

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Palmer, C. D.	Cincinnati, Ohio.	1867
Palmer, Edward D. G.	Boston, Mass.	1853
Palmer, E. R.	Louisville, Ky.	1867
†Palmer, George G. [d. 1868]	Stonington, Conn.	1864
Palmer, Gideon S.	Gardner, Me.	1854
Palmer, J. W.	Victor, N. Y.	1864
Palmer, Wm. G.	Washington, D. C.	1866
Pancoast, Joseph	Philadelphia, Pa.	1848
Pancoast, Wm. H.	Philadelphia, Pa.	1868
Paoli, Gerhardt C.	Chicago, Ill.	1863
Park, Edwin A.	New Haven, Conn.	1860
Park, Jno. S.	Franklin, Tenn.	1857
Parker, D. M.	Boston, Mass.	1865
Parker, David T.	Farmington, N. H.	1855
Parker, Edward H.	Poughkeepsie, N. Y.	1853
Parker, Hiram	Lowell, Mass.	1860
Parker, M.	Chicago, Ill.	1863
Parker, Moses	Melrose, Mass.	1865
Parker, Samuel	Lancaster, Pa.	1854
Parker, Willard	New York, N. Y.	1848
Parker, W. W.	Richmond, Va.	1851
Parkhurst, William H. H.	Frankfort, N. Y.	1855
†Parkman, George	Boston, Mass.	1849
†Parkman, Samuel	Boston, Mass.	1847
Parks, C. R.	Bloomington, Ill.	1863
Parks, Jr., Luther	Boston, Mass.	1849
Parmley, Eleazer	New York, N. Y.	1849
Parr, Wm. P.	Indianapolis, Ind.	1865
†Parrish, Isaac [d. 1852]	Philadelphia, Pa.	1847
Parrish, Joseph	Media, Pa.	1847
Parry, Charles	Indianapolis, Ind.	1850
Parry, Ely	Lancaster, Pa.	1851
Parsons, Charles W.	Providence, R. I.	1849
Parsons, John	Mt. Pleasant, Kansas.	1867
Parsons, Usher, V. P.	Providence, R. I.	1847
Parvin, Theophilus	Indianapolis, Ind.	1867
Pashley, John S.	Osceola, Ill.	1863
Patch, Franklin Fletcher	Boston, Mass.	1865
Patrick, Spicer	Kanawha C. H., West Va.	1850
†Patterson, Geo. W. [d. 1852]	Philadelphia, Pa.	1848
†Patterson, Henry S. [d. 1854]	Philadelphia, Pa.	1847

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Patterson, M. A.	Tecumseh, Mich.	1856
Patteson, Samuel A.	Manchester, Va.	1852
†Pattison, Granville S.	New York, N. Y.	1847
Paul, J. Rodman	Philadelphia, Pa.	1847
Payne, Alban S.	Paris, Va.	1852
Payne, F. R.	Marshall, Ill.	1867
Peabody, Leonard W.	Epsom, N. H.	1865
Pease, Clark G.	Janesville, Wis.	1855
Pease, Leavitt Thaxter	Williamsburg, Ohio.	1867
Peaslee, Edmund R.	New York, N. Y.	1849
Peck, Wm. D.	Sterling, Mass.	1849
Peck, W. F.	Davenport, Iowa.	1865
Peckham, Fenner H.	Providence, R. I.	1858
†Peebles, J. F. [d. 1858]	Petersburg, Va.	1847
Peirce, G. W.	Leominster, Mass.	1865
†Peirson, A. L.	Salem, Mass.	1847
Peirson, E. B.	Salem, Mass.	1849
Pelton, Lucius F.	Mt. Kisco, N. Y.	1864
Penn, George	Fee-fee, Mo.	1857
Pennington, Joel	Milton, Ind.	1850
Pennington, Samuel H.	Newark, N. J.	1848
†Pennypacker, Isaac A.	Philadelphia, Pa.	1855
†Pepper, William [d. 1864]	Philadelphia, Pa.	1847
Perchment, John	Pittsburg, Pa.	1867
Percy, Samuel R.	New York, N. Y.	1864
Perkins, Chauncey F.	Erie, Pa.	1867
Perkins, Edward A.	Boston, Mass.	1865
Perkins, George A.	Salem, Mass.	1865
Perkins, Henry C.	Newburyport, Mass.	1849
†Perkins, John D. [d. 1860]	Smyrna, Del.	1848
†Perkins, John P.	Great Barrington, Mass.	1856
Perkins, Joseph	Castleton, Vt.	1849
Perkins, N. C.	Franklin, Tenn.	1857
Perry, Joseph	Crete, Ill.	1863
†Perry, Marshall S.	Boston, Mass.	1849
Peters, George A.	New York, N. Y.	1853
Peters, John C.	New York, N. Y.	1868
†Peticolas, A. E. [d. 1868]	Richmond, Va.	1852
Phelps, E. B.	Owego, N. Y.	1860
Phelps, Edward E.	Windsor, Vt.	1847
Phelps, J. W.	Wolcotville, Conn.	1864

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Phelps, Thaddeus	Attleborough, Mass.	1853
Philips, W. H.	Kenton, Ohio.	1856
Phillips, B. H.	Pembroke, N. H.	1865
Phillips, James	Washington, D. C.	1866
Phillips, John H.	Pennington, N. J.	1853
Phinizy, T. B.	Augusta, Ga.	1851
Phister, Jr., Benjamin	Philadelphia, Pa.	1864
Pierce, A. B.	Halifax, N. C.	1858
†Pierce, George A. [d. 1862]	Providence, R. I.	1858
Pierce, Hosea	Winchester, N. H.	1856
Pierce, John	Edgartown, Mass.	1849
Pierson, Daniel	Augusta, Ill.	1863
Pierson, William	Orange, N. J.	1847
Pierson, William, Jr.	Orange, N. J.	1856
†Pierson, William S.	Windsor, Conn.	1849
Pifford, Henry G.	New York, N. Y.	1865
Piggot, A. Snowden	Baltimore, Md.	1855
†Pike, Nathan S.	Sterling Hill, Conn.	1853
Pillsbury, Harlin	Lowell, Mass.	1860
Pillsbury, Harlin H.	Medford, Mass.	1865
†Pillsbury, John D.	Lowell, Mass.	1849
Pinckney, Ninian (U. S. N.)	Easton, Md.	1848
Pinkston, Alexander Rufus	Nashville, Tenn.	1869
Pitcher, Zina, P.	Detroit, Mich.	1850
†Pitkin, A. S.	Burlington, Vt.	1849
Pittman, Newson J.	Tarboro, N. C.	1849
Platt, Alonzo	Grand Rapids, Mich.	1856
Platt, Gideon L.	Waterbury, Conn.	1848
Polin, John H.	Springfield, Ky.	1859
Pollak, S.	St. Louis, Mo.	1852
Pollard, George Fitz Edward	Montgomery, Ala.	1869
Pollard, Thomas	Richmond, Va.	1858
Pollock, Alex. McCandless	Pittsburg, Pa.	1850
Pollock, Samuel	Williamsport, Pa.	1866
†Pond, Benjamin	Westborough, Mass.	1849
Pond, James O.	New York, N. Y.	1847
Poole, Alexander	Chelsea, Mass.	1849
Pope, Charles A., V. P.; P.	St. Louis, Mo.	1851
Pope, Harold H.	Rome, N. Y.	1856
Porcher, F. Peyer	Charleston, S. C.	1851
Porcher, Francis Y.	Charleston, S. C.	1851

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†Porter, E. M.	Bridgeton, N. J.	1852
Porter, G. Ellis	Lonacoming, Md.	1868
Porter, Henry N.	New York Mills, N. Y.	1864
Porter, Isaac G.	New London, Conn.	1860
Porter, John B.	United States Army.	1856
Porter, Joshua N., Jr.	North Brookfield, Mass.	1860
Porter, L. C.	Bowling Green, Ky.	1857
†Porter, Mortimer G. [d. 1863]	New York, N. Y.	1860
†Porter, R. M.	Nashville, Tenn.	1857
Porter, Robert R.	Wilmington, Del.	1847
Porter, Winslow B.	Alstead, N. H.	1865
Post, Alfred C.	New York, N. Y.	1848
Potter, Fred. Ensign (U. S. N.)	Suncook, N. H.	1869
†Potter, J. F. [d. 1868]	Cincinnati, Ohio.	1855
Potter, U.	Minden, N. Y.	1856
Potts, Thomas R.	St. Paul, Minn.	1856
Powell, J. F.	Middlebury, Va.	1851
Powell, Llewellyn	Louisville, Ky.	1850
Powell, Samuel F.	Baltimore, Md.	1866
Powell, Thomas S.	Sparta, Ga.	1857
Power, R. H.	Yorktown, Va.	1852
†Power, William	Baltimore, Md.	1847
†Pratt, Calvin B.	Bridgewater, Mass.	1860
Pratt, Jefferson	Hopkinton, Mass.	1856
Pray, T. J. W.	Dover, N. H.	1865
Prentiss, D. Webster	Washington, D. C.	1868
Presbrey, Silas D.	Taunton, Mass.	1865
Prescott, William	Concord, N. H.	1849
Preston, A. G.	Greencastle, Ind.	1867
Preston, G. H.	Tolland, Conn.	1865
Preston, S. C.	Hartford, Conn.	1864
Pretlow, Richard	Covington, Ky.	1867
Price, Curtis Albert	Abingdon, Ill.	1869
Price, Jacob	West Chester, Pa.	1864
Prince, David, V. P.	Jacksonville, Ill.	1854
Prioleau, J. Ford	Charleston, S. C.	1854
Prioleau, Thomas G.	Charleston, S. C.	1849
Puffer, Chenery	Shelburne Falls, Mass.	1865
Punderson, Samuel	New Haven, Conn.	1848
†Purdy, Jotham [d. 1858]	Elmira, N. Y.	1853
Purdy, Samuel A.	New York, N. Y.	1853

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Purple, S. S.	New York, N. Y.	1853
Putnam, Charles G.	Boston, Mass.	1849
Putnam, Sumner	Montpelier, Vt.	1868
Pusey, H. K.	Garnetsville, Ky.	1859
Quackenbush, J. V. P.	Albany, N. Y.	1864
Quintard, C. T.	Roswell, Ga.	1852
Radcliff, Samuel J.	Washington, D. C.	1868
Ralston, J. N.	Quincy, Ill.	1854
Ramsay, Cyrus	New York, N. Y.	1864
Ramsey, Frank A.	Knoxville, Tenn.	1849
Ramsey, J. W.	Clarksburg, West Va.	1867
Rand, B. Howard	Philadelphia, Pa.	1868
†Randolph, Jacob	Philadelphia, Pa.	1847
Randolph, Robert C.	Mellwood P. O., Va.	1852
Rankin, C. D.	Peoria, Ill.	1863
†Ranney, W. R.	Townshend, Vt.	1848
Ransom, M.	Murfreesboro', Tenn.	1857
Raphael, Benjamin J.	New York, N. Y.	1860
Raub, John K.	Quarryville, Pa.	1855
Ravenel, St. Julien	Charleston, S. C.	1851
Rawlins, F. J. C.	Knightstown, Ind.	1867
Ray, J. E.	Chicago, Ill.	1867
Ray, George T.	Meadville, Pa.	1868
†Ray, L. G. [d. 1864]	Paris, Ky.	1850
Rea, R. L.	Chicago, Ill.	1859
Read, A. N.	Norwalk, Ohio.	1855
Read, James B.	Savannah, Ga.	1851
Read, William	Boston, Mass.	1865
Read, Zachariah	Mount Holly, N. J.	1847
Ready, J. C.	Edgefield, S. C.	1851
†Ream, John [d. 1869]	Hempfield, Pa.	1854
Reamy, Thaddeus A.	Zanesville, Ohio.	1867
Reed, A. D.	Cincinnatus, N. Y.	1864
Reeder, William	Corydon, Ind.	1859
†Reese, D. Meredith, V. P.	New York, N. Y.	1847
Reese, Augustus Joren	Cahawba, Ala.	1859
Reese, John J.	Philadelphia, Pa.	1852
Reese, Walter Peterson	Selma, Ala.	1857
Reese, William W.	Brooklyn, N. Y.	1864

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Reeve, John C.	Dayton, Ohio.	1866
†Reid, Wm. W.	Rochester, N. Y.	1860
†Remington, Isaac [d. 1862]	Philadelphia, Pa.	1847
Reyburn, Robert	Washington, D. C.	1863
†Reyburn, Thomas	St. Louis, Mo.	1848
Reynolds, Edward	Boston, Mass.	1849
Reynolds, James B.	New York, N. Y.	1853
Reynolds, John H.	Wilton, N. Y.	1853
Reynolds, John P.	Boston, Mass.	1861
Reynolds, Joseph	Concord, Mass.	1848
Reynolds, Tabor B.	Wilton, N. Y.	1849
Rhoades, Sumner	Ithaca, N. Y.	1864
Ribble, W. B.	Millstone, N. J.	1864
Rice, David	Leverett, Mass.	1865
Rice, F.	Memphis, Tenn.	1859
†Richards, C. Orrick	Lancaster, Pa.	1853
†Richards, John [d. 1862]	Washington, D. C.	1858
Richards, Joseph W.	New York, N. Y.	1850
Richardson, A. P.	Walpole, N. H.	1865
†Richardson, Braton [d. 1864]	Montrose, Pa.	1863
Richardson, B. F.	Cincinnati, Ohio.	1859
Richardson, David D.	Philadelphia, Pa.	1864
Richardson, E.	Monticello, Ky.	1859
Richardson, Tobias Gibson	New Orleans, La.	1855
Richardson, Joseph G.	Philadelphia, Pa.	1867
Richardson, Samuel	Watertown, Mass.	1853
Richardson, Samuel A.	Marlboro', N. H.	1860
†Richardson, S. B.	Louisville, Ky.	1858
Richardson, Wm. H.	Mansfield, Conn.	1860
Richardson, W. L.	Montrose, Pa.	1863
Richie, Robert W.	Philadelphia, Pa.	1864
Richmond, James S.	Woodstock, Vt.	1865
Rieser, Frank	Reading, Pa.	1856
Riggs, Benj. Hogan	Selma, Ala.	1869
†Riley, A. A.	Fulton, Mo.	1854
Riley, John C.	Washington, D. C.	1855
Riley, John M.	New Albany, Ind.	1859
Riley, Joshua	Georgetown, D. C.	1847
Riley, William	Baltimore, Md.	1853
Ritchie, Stephen	Liberty, Mo.	1859
Ritchie, Louis Warfield	Georgetown, D. C.	1866

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Ritter, Levi	Plainfield, Ind.	1858
†Rivers, Henry Wheaton [d.'68]	Providence, R. I.	1852
Rives, L. C.	Cincinnati, Ohio.	1850
Robb, Andrew	Blanchester, Ohio.	1867
Robbins, James W.	Uxbridge, Mass.	1849
Robbins, Joseph	Quincy, Ill.	1865
Roberts, George C. M.	Baltimore, Md.	1847
Roberts, Thos. A.	Cecilton, Md.	1866
Robertson, C.	McConnelsville, Ohio.	1856
Robertson, F. M.	Charleston, S. C.	1851
Robertson, T. S.	Winsboro', S. C.	1851
Robinson, Alexander C.	Baltimore, Md.	1847
Robinson, J. Henry	Southboro', Mass.	1865
†Robinson, Lucius Gain [d.'58]	Detroit, Mich.	1856
Robinson, William	Dover, Ill.	1855
Robison, James D.	Wooster, Ohio.	1850
†Roby, Joseph	Baltimore, Md.	1849
Rochester, Thomas F.	Buffalo, N. Y.	1860
Rockwell, P. Guiteau	New Haven, Conn.	1854
Rockwell, William H.	Brattleboro', Vt.	1849
†Roddey, F. W. [d. 1865]	Richmond, Va.	1852
Rodgers, James	Knoxville, Tenn.	1857
Rodgers, Joseph H. D.	Madison, Ind.	1859
Rodman, Lewis	Philadelphia, Pa.	1847
Rodrigues, B. A.	Charleston, S. C.	1851
†Rogers, Benjamin	Hartford, Conn.	1849
Rogers, David L.	New Rochelle, N. Y.	1848
Rogers, H. R.	Dunkirk, N. Y.	1868
†Rogers, James B.	Philadelphia, Pa.	1847
Rogers, J. G.	New Richmond, Ohio.	1858
Rogers, Joseph G.	Madison, Ind.	1867
†Rogers, J. Kearney	New York, N. Y.	1849
Rogers, Lewis	Louisville, Ky.	1859
Rogers, Robert E.	Philadelphia, Pa.	1852
Rogers, Stephen	New York, N. Y.	1865
Rogers, T. C.	Willowgrove, Del.	1864
Rogers, Thomas P.	Bloomington, Ill.	1854
Rohrer, Benjamin	Columbia, Pa.	1851
Ronald, G. W.	Louisville, Ky.	1859
Root, Franklin W.	Hamilton, N. Y.	1864
Root, Martin	Byfield, Mass.	1855

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Root, O. S.	Pittsfield, Mass.	1855
Rose, Landon C.	Laporte, Ind.	1853
Rose, M. H.	Danville, Ind.	1867
Rosenfeld, Albert	Cincinnati, Ohio,	1868
Rosenthal, J. M.	Fort Wayne, Ind.	1867
Ross, Francis Armstrong	Mobile, Ala.	1869
Ross, John D.	Williamsburg, Pa.	1854
Ross, Joseph P.	Chicago, Ill.	1863
Ross, R. D.	Grand Sabine, Cherokee Nation.	1854
Rothrock, Abm.	McVeyton, Pa.	1855
Rouse, Rudolphus	Peoria, Ill.	1848
†Rowan, B. G.	Fort Wayne, Ind.	1859
Rowland, Geo.	Cold Creek, Ind.	1867
Rublee, Chauncey M.	Montpelier, Vt.	1865
Ruschenberger, W. S. W.	Philadelphia, Pa.	1850
Russell, Geo. B.	Detroit, Mich.	1856
Russell, Gurdon W.	Hartford, Conn.	1853
Russell, Ira	Natick, Mass.	1858
Russell, John W.	Mount Vernon, Ohio.	1860
Russell, Le Baron	Boston, Mass.	1849
Russell, Wm.	Utica, N. Y.	1864
Rutherford, Wm. W.	Harrisburg, Pa.	1868
Ryerson, Thomas	Newton, N. J.	1864
Sabin, Henry L.	Williamstown, Mass.	1864
†Sachse, J. G.	Lancaster, Ohio.	1850
Sager, Abner	Ann Arbor, Mich.	1856
Salisbury, Samuel T.	Plymouth, Conn.	1855
Salisbury, Stephen	Brookline, Mass.	1852
Salmon, H. B.	Stuyvesant, N. Y.	1865
Salter, Richard H.	Boston, Mass.	1860
†Sams, C. C. [d. 1865]	Hilsborough, Ohio.	1852
Samuel, J. B.	Carrollton, Ill.	1863
†Sanborn, E. K.	Rutland, Vt.	1860
†Sanborn, Nathan	Henniker, N. H.	1850
Sanborn, Thomas	New Port, N. H.	1858
Sanford, John F.	Keokuk, Iowa.	1854
Sanford, Leonard J.	New Haven, Conn.	1855
Sands, D. Jerome	Rye, N. Y.	1860
Sands, Henry B.	New York, N. Y.	1864
Sappington, John K.	Havre de Grace, Md.	1855

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Sappington, Thomas	Liberty, Md.	1848
Sargent, Winthrop	Philadelphia, Pa.	1849
†Sargent, Henry	Worcester, Mass.	1855
Sargent, Joseph	Worcester, Mass.	1853
†Sargent, J. F.	Concord, N. H.	1850
Sargent, Seneca	Lawrence, Mass.	1858
Satterwhite, T. P.	Louisville, Ky.	1859
Saunders, Augustus L.	Brookfield, N. Y.	1853
Saulsbury, Gove	Dover, Del.	1855
Savage, James	Argyle, N. Y.	1870
Saville, Henry M.	Boston, Mass.	1865
Savory, Charles A.	Lowell, Mass.	1848
Sayles, J. A.	Cleveland, Ohio.	1856
Sayre, David M.	Newton, N. J.	1860
Sayre, Lewis Albert	New York, N. Y.	1848
Scarff, W. D.	Bellefontaine, Ohio.	1858
†Schenck, Ferdinand S. [d.' 60]	Camden, N. J.	1847
Schenck, J. V.	Camden, N. J.	1858
Schenck, W. L.	Franklin, Ohio.	1856
Schilling, Ernest	New York, N. Y.	1853
†Schneck, B. F. [d. 1865]	Lebanon, Pa.	1857
Scholfield, Edwin	Philadelphia, Pa.	1864
Schoolfield, I. N.	Petersburg, Va.	1858
Schrack, Jno.	Shannonville, Pa.	1859
Schultz, S. S.	Harrisburg, Pa.	1868
Scott, Martin P.	Hooversville, Md.	1851
Scruggs, S. O.	Clantonville, La.	1857
Seavey, Calvin	Bangor, Me.	1865
Secord, Van Courtland	Galva, Ill.	1863
Sedgwick, W. W.	Sandwich, Ill.	1863
Seelye, Samuel Dibble	Montgomery, Ala.	1869
Seip, Amos	Easton, Pa.	1864
†Selden, Henry	Norfolk, Va.	1848
Selden, William	Norfolk, Va.	1847
Sell, Edward H. M.	New York, N. Y.	1867
Semmes, Alexander Jenkins, s.	Savannah, Ga.	1853
Semmes, Alphonso Thomas	Canton, Miss.	1869
Senter, W. D.	Hannas P. O., Tenn.	1857
Severance, R. A.	Bellview, Ohio.	1867
†Sexton, H. G. [d. 1865]	Rushville, Ind.	1850
Sexton, M.	Rushville, Ind.	1867

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†Seymour, George	Litchfield, Conn.	1858
Seymour, Levi Dwight	Greenfield, Mass.	1860
Shackford, Chas. H.	Chelsea, Mass.	1860
Shaler, N. B.	Newport, Ky.	1867
Shanks, John	New York, N. Y.	1855
†Shantz, Samuel E. [d. 1868]	Utica, N. Y.	1865
Shapleigh, Edward B.	Philadelphia, Pa.	1866
Shattuck, George C.	Boston, Mass.	1847
Shaw, Benjamin S.	Boston, Mass.	1865
Shaw, Thos. W.	Pittsburg, Pa.	1868
Sheldon, B.	Cleveland, Ohio.	1856
Sheldon, L. R.	Boston, Mass.	1865
Sheller, Adam	Mt. Joy, Pa.	1856
Shelmerdine, R. Q.	Philadelphia, Pa.	1858
Shelton, John D.	Jamaica, N. Y.	1852
Shepard, Charles	Grand Rapids, Mich.	1856
Shepherd, Charles V.	Charleston, S. C.	1860
Shepherd, M.	Payson, Ill.	1850
Shields, P. S.	New Albany, Ind.	1859
†Shipman, Azariah B. [d. 1868]	Syracuse, N. Y.	1847
Shippen, Edward (U. S. N.)	Philadelphia, Pa.	1864
Shiveley, A. H.	Campbellsville, Ky.	1859
Shively, James S.	Marion, Ind.	1850
Sholl, E. R.	Reading, Pa.	1860
Shove, Harmon W.	Woodbury, Conn.	1860
Shove, Seth	Katonah, N. Y.	1860
Shrady, George F.	New York, N. Y.	1860
Shrady, John	New York, N. Y.	1867
Shufford, F. B.	Holly Springs, Miss.	1857
Shumard, B. F.	St. Louis, Mo.	1867
†Shumway, C. W.	Chicago, Ill.	1863
Shumway, Samuel	Essex, N. Y.	1860
Shurtleff, Augustine	Brookline, Mass.	1853
Shurtleff, Nathaniel B.	Boston, Mass.	1849
Sibley, E. H.	Lodi, Ohio.	1856
Sickler, John R.	Mantua, N. J.	1855
Silliman, Jr., Benjamin	New Haven, Conn.	1852
Silver, Silas B.	Glenville, Md.	1867
†Simonds, Joseph C.	New Orleans, La.	1849
†Simons, Lewis E.	Saxton's River, Vt.	1864
†Simons, T. Y., V. P.	Charleston, S. C.	1857

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Simpson, Josiah (U.S.A.)	Baltimore, Md.	1853
Sinclair, Alexander D.	Boston, Mass.	1865
Sinks, Tiffin	Leavenworth, Ks.	1863
Sinn, Thomas	Libertytown, Md.	1866
Sinnet E.	Granville, Ohio.	1867
Siveter, Thomas	Salem, Iowa.	1854
Skelling, David	Winchester, Ill.	1854
Skillman, Henry Martyn	Lexington, Ky.	1859
†Skilton, Avery J.	Troy, N. Y.	1848
†Skinner, Alden [d. 1863]	Rockville, Conn.	1849
Skinner, Jonathan F.	Barton, Vt.	1865
Slade, Daniel D.	Boston, Mass.	1865
Sloan, John	New Albany, Ind.	1851
Slocum, Alfred M.	Philadelphia, Pa.	1858
Slusser, Lewis	Canton, Ohio.	1856
Smalley, Adoniram	Lebanon, N. H.	1848
Smaltz, J. Henry	Philadelphia, Pa.	1855
Smith, Albert	New Rochelle, N. Y.	1847
Smith, Albert	Peterborough, N. H.	1848
†Smith, Amos C.	Medina, C. H., Ohio.	1854
Smith, Charles G.	Chicago, Ill.	1864
Smith, Charles D..	New York, N. Y.	1847
Smith, David P.	Springfield, Mass.	1860
†Smith, Dryden [d. 1868]	Biddeford, Me.	1865
Smith, Edwin	Dayton, Ohio.	1850
Smith, E. F.	St. Louis, Mo.	1855
Smith, Jr., Francis Gurney	Philadelphia, Pa.	1849
Smith, G. F.	Somerville, Tenn.	1857
Smith, George K.	Brooklyn, N. Y.	1866
Smith, Gouverneur M.	New York, N. Y.	1858
Smith, Geo. Wash.	Canton, Miss.	1869
Smith, Heber	New Orleans, La.	1869
Smith, Henry	Neshanic, N. J.	1860
Smith, Henry H.	Philadelphia, Pa.	1853
Smith, Horatio S.	Brooklyn, N. Y.	1860
Smith, Howard	New Orleans, La.	1869
Smith, H. M.	Vincennes, Ill.	1850
Smith, H. Yale	Philadelphia, Pa.	1855
†Smith, James M.	Springfield, Mass.	1850
Smith, James S.	Armada, Mich.	1856
Smith, Jerome Candee	New York, N. Y.	1864

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†Smith, J. B.	Cincinnati, Ohio.	1858
Smith, J. D.	Fayette, Mo.	1854
Smith, John E.	Washington, D. C.	1867
Smith, J. Lewis	New York, N. Y.	1864
Smith, Joseph H.	Dover, N. H.	1849
†Smith, Joseph Mather [d. '65]	New York, N. Y.	1847
Smith, Joseph T.	Canandaigua, N. Y.	1860
Smith, Joseph W.	Petersburg, Va.	1855
Smith, Latham A.	New Milford, Pa.	1860
†Smith, Lyndon A., V. P. [d. '65]	Newark, N. J.	1847
Smith, Milo	Chattanooga, Tenn.	1857
Smith, Montross Leslie	New York, N. Y.	1866
†Smith, Moses B. [d. 1855]	Philadelphia, Pa.	1847
Smith, Nathan R.	Baltimore, Md.	1847
†Smith, Orrin [d. 1867]	Chicago, Ill.	1849
Smith, Robert Mark	Athens, Ga.	1869
Smith, Samuel M.	Columbus, Ohio.	1848
Smith, Samuel P.	Cumberland, Md.	1849
Smith, Stephen	New York, N. Y.	1853
Smith, S. Hanbury	New York, N. Y.	1850
Smith, Thomas	Society Hill, S. C.	1851
†Smith, Thomas Mackie	Brandywine, Del.	1849
Smythe, Andrew Woods	New Orleans, La.	1869
Smythe, James	Boston, Mass.	1865
Snavely, C. J.	Manheim, Pa.	1866
Snead, Albert	Richmond, Va.	1852
†Sneed, William C.	Frankfort, Ky.	1859
Snelling, J. R.	Peoria, Ill.	1867
†Snow, A. B.	Boston, Mass.	1849
Snow, Edward M.	Providence, R. I.	1853
†Snow, Simeon [d. 1865]	Root, N. Y.	1849
Snyder, Morgan	Fort Plain, N. Y.	1847
Sommes, Joseph	Vincennes, Ind.	1853
Southard, Lott	Newark, N. J.	1864
Southworth, Charles T.	Monroe, Mich.	1867
Southwick, Moses D.	Millville, Mass.	1863
Sowell, J. F.	Athens, Ala.	1857
Sowyer, Longdon	Springfield, Vt.	1865
†Spalding, James [d. 1858]	Montpelier, Vt.	1849
Spaulding, Edward	Nashua, N. H.	1849
Spaulding, Joel	Lowell, Mass.	1865

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Spaulding, Leonard	Millbury, Mass.	1866
Spaulding, Miles	Groton, Mass.	1849
Spaulding, Phineas	Haverhill, N. H.	1850
Speir, S. Fleet	Brooklyn, N. Y.	1864
†Spencer, Pitman C. [d. 1860]	Petersburg, Va.	1852
†Spencer, Thomas D. [d. 1857]	Philadelphia, Pa.	1853
Spillman, C. H.	Harrodsburg, Ky.	1850
Spitler, Adam	Carthage, Ill.	1854
Spofford, Jeremiah	Greenland, Mass.	1849
Spooner, Edward A.	Philadelphia, Pa.	1860
†Spooner, Paul	New Bedford, Mass.	1848
Spooner, John P.	Milton, Mass.	1849
Sprague, Francis P.	Boston, Mass.	1865
Sprague, Joseph	Dubuque, Iowa.	1863
Sprague, Jenks S.	Exeter, N. Y.	1847
Sprague, L. S.	Williamson, N. Y.	1860
Sprague, Seth L.	Boston, Mass.	1853
Squibb, Edward R.	Brooklyn, N. Y.	1860
Squire, T. H.	Elmira, N. Y.	1868
Staats, Barent P.	Albany, N. Y.	1853
Stackpole, P. A.	Dover, N. H.	1849
Stahl, Daniel	Quincy, Ill.	1854
Stanchfield, J. K.	Elmira, N. Y.	1864
Stanley, Wm. S.	Mamaronick, N. Y.	1865
Stanton, David	New Brighton, Pa.	1856
†Stearns, John [d. 1848]	New York, N. Y.	1847
Stebbins, N. D.	Detroit, Mich.	1855
†Stedman, Charles H. [d. 1866]	Boston, Mass.	1848
Steele, A. J.	St. Louis, Mo.	1867
†Steele, E. A.	Marshall, Ill.	1863
Steele, H. K.	Dayton, Ohio.	1850
Steele, James M.	Grandview, Ill.	1857
Steiner, Lewis H.	Frederick, Md.	1850
Stephenson, Marcus Pendleton	New York, N. Y.	1858
†Stephenson, Mark	New York, N. Y.	1850
Stetson, James A.	Quincy, Mass.	1860
Stevens, B. L.	Union, Ky.	1850
Stevens, Charles W.	St. Louis, Mo.	1854
Stevens, E. B.	Cincinnati, Ohio.	1859
Stevens, Francis J.	Haverhill, Mass.	1864
Stevens, Joshua	Lebanon, Ohio.	1850

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Stevens, L.	Constantia, N. Y.	1864
Stevens, Thaddeus M.	Indianapolis, Ind.	1867
Stevens, William F.	Stoneham, Mass.	1849
Stevenson, J. S.	Baltimore, Md.	1850
†Steward, Joseph D. [d. 1854]	Philadelphia, Pa.	1847
Stewart, Alexander	Shippensburg, Pa.	1868
Stewart, A. E.	Bloomington, Ill.	1859
Stewart, James	New York, N. Y.	1853
Stewart, James A.	Baltimore, Md.	1868
Stewart, Morse	Detroit, Mich.	1856
Stewart, Philander	Peekskill, N. Y.	1853
Steward, Scott	Philadelphia, Pa.	1860
Stewardson, Thomas	Philadelphia, Pa.	1860
Stickney, Charles D.	New Bedford, Mass.	1860
Stiles, Joseph N.	Windsor, Vt.	1849
Stiles, R. Cresson	Flatbush, N. Y.	1860
Stillé, Alfred, s.	Philadelphia, Pa.	1847
†Stillé, Moreton [d. 1855]	Philadelphia, Pa.	1853
Stillman, Roswell F.	North Haven, Conn.	1860
Stillman, Sidney	Millerton, N. Y.	1865
Stillson, Joseph	Bedford, Ind.	1867
Stimson, Jeremy	Dedham, Mass.	1849
Stipp, George W.	Bloomington, Ill.	1854
Stirling, Thomas B.	New York, N. Y.	1864
Stirman, W. D.	Owensboro', Ky.	1859
St. John, Gamaliel H.	Merwinsville, Conn.	1849
Stockard, W. P.	Mount Pleasant, Tenn.	1857
Stockbridge, T. Gilman	Bath, Me.	1863
Stocker, Anthony E.	Philadelphia, Pa.	1852
Stockwell, Cyrus M.	Port Huron, Mich.	1856
Stoddard, Charles L.	East Troy, Wis.	1863
Stokes, William H.	Baltimore, Md.	1848
Stone, A. R.	Almonte, Mich.	1856
Stone, Eben	Walpole, Mass.	1860
Stone, Henry O.	Salem, Mass.	1853
†Stone, James W.	Boston, Mass.	1850
†Stone, John O. [d. 1868]	New York, N. Y.	1853
†Stone, Joseph [d. 1849]	Hardwick, Mass.	1849
Stone, Robert	New Haven, Conn.	1866
Stone, Robert K.	Washington, D.C.	1852
Stone, Warren, Sr.	New Orleans, La.	1869

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Stone, William P.	Danbury, N. H.	1853
Storck, Edward	Buffalo, N. Y.	1863
Storer, D. Humphreys, V.P.; P.	Boston, Mass.	1849
Storer, Horatio R., S.; V. P.	Boston, Mass.	1856
Stormont, D. W.	Topeka, Kansas.	1858
Story, D. R.	Proctorsville, Vt.	1865
Stout, Joseph	Ottawa, Ill.	1854
Stratton, Benjamin H.	Mount Holly, N. J.	1852
Stratton, Elijah	Northfield, Mass.	1860
Strawbridge, James D.	Danville, Pa.	1860
Street, Charles C.	Boston, Mass.	1865
Strew, William W.	New York, N. Y.	1858
Stroud, F. B.	Gladeville, Tenn.	1857
Stroud, Wm. D.	Philadelphia, Pa.	1864
Stuart, John R.	Newton, N. J.	1855
Studdiford, J. Henry	Lambertville, N. J.	1866
Sturtevant, James M.	Rome, N. Y.	1858
Sullivan, John L.	Malden, Mass.	1865
Sullivan, Richard J. O.	New York, N. Y.	1864
Summerell, J. J.	Salisbury, N. C.	1858
Sumner, Charles F.	Bolton, Conn.	1863
†Sumner, George	Hartford, Conn.	1847
Sumner, George O.	New Haven, Conn.	1860
Sutton, George	Aurora, Ind.	1856
Sutton, W. L., V. P.	Georgetown, Ky.	1850
Swallow, G. C.	Columbia, Mo.	1858
Swan, Charles E.	Calais, Me.	1856
Swartz, Joseph	Duncannon, Pa.	1866
Swartzwelder, A. C.	New Orleans, La.	1869
Swasey, Chas. L.	New Bedford, Mass.	1867
†Swayne, Caleb [d. 1860]	London Grove, Pa.	1859
Sweeney, R. L.	Marion, Ohio.	1867
†Swett, John A.	New York, N. Y.	1847
Swett, John L.	New Port, N. H.	1864
Swinburne, John	Tompkinsville, N. Y.	1853
Swift, Edward	Easton, Pa.	1855
†Taft, Marcus L. [d. 1850]	New York, N. Y.	1849
Taggart, Thomas M.	Dalton, Ohio.	1859
Taggart, W. W.	Smithville, Ohio.	1854
Taggert, J. M.	Dalton, Ohio.	1863

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Talbert, A. V.	Westfield, Ind.	1857
Talcott, Alvan	Guilford, Conn.	1852
Taliaferro, W. I.	Cincinnati, Ohio.	1850
Talley, A. N.	Columbia, S. C.	1858
Tandy, David C.	St. Louis, Mo.	1854
Tanneyhill, G. Lane	Baltimore, Md.	1866
Tappan, B.	Steubenville, Ohio	1856
Taylor, Ashmun H.	Shelburne Falls, Mass.	1856
Taylor, Charles F.	New York, N. Y.	1866
Taylor, D. W.	Jalapa, Ind.	1859
Taylor, Edward	Middletown, N. J.	1864
Taylor, Henry,	Mount Clemens, Mich.	1853
Taylor, Isaac E.	New York, N. Y.	1853
Taylor, James	Cincinnati, Ohio.	1850
Taylor, John P.	East Cambridge, Mass.	1860
Taylor, J. Winthrop	U. S. Navy.	1865
Taylor, Kidder R.	Columbia, Va.	1852
Taylor, Morse K.	Keokuk, Iowa.	1863
†Taylor, Othniel H. [d. 1869]	Camden, N. J.	1847
†Taylor, William [d. 1865]	Manlius, N. Y.	1853
Taylor, Wm. H.	Cincinnati, Ohio.	1867
Taylor, Wm. Terry	Philadelphia, Pa.	1869
†Teackle, John N.	Baltimore, Md.	1848
Tefft, Lake Innocent	Syracuse, N. Y.	1847
Tellkampt, Theodore A.	New York, N. Y.	1855
Temple, J. J.	Covington, Ky.	1867
Ten Brook, John	Paris, Ill.	1863
Tenbroeck, S. B.	Paris, Ill.	1867
Terry, A. R.	Joliet, Ill.	1863
Tewksbury, Samuel H.	Portland, Me.	1860
Thacker, Wm. H.	Fort Wayne, Ind.	1867
Thall, W. C.	Fayetteville, Ohio.	1863
Thayer, Samuel W.	Burlington, Vt.	1849
Thayer, William Henry	Keene, N. H.	1860
Thaxter, Duncan M. B.	Boston, Mass.	1860
†Theobald, Elisha W.	Baltimore, Md.	1848
Thomas, Alexander	Dorchester, Mass.	1852
Thomas, A. G.	Savannah, Ga.	1859
Thomas, Daniel G.	Utica, N. Y.	1850
†Thomas, Geo. W. [d. 1848]	Norristown, Pa.	1847
Thomas, Isaac	West Chester, Pa.	1849

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†Thomas, John M. [d. 1853]	Georgetown, D. C.	1848
Thomas, J. R.	Bay City, Mich.	1867
Thomas, K. G.	Alliance, Ohio.	1863
Thomas, N. L.	Clarksville, Tenn.	1850
†Thomas, Richard H.	Baltimore, Md.	1848
†Thomas, Robert P. [d. 1864]	Philadelphia, Pa.	1855
Thomas, Wm.	Bellefonte, Ohio.	1868
Thomas, Wm. George	Wilmington, N. C.	1851
Thomas, Wm. M.	Darlington, Wis.	1866
Thomason, T. J.	Perrineville, N. J.	1860
Thompson, Alexander	Aurora, N. Y.	1853
Thompson, A. H.	Walden, N. Y.	1856
Thompson, Austin W.	Northampton, Mass.	1865
†Thompson, James	Northampton, Mass.	1856
Thompson, J. B.	Columbus, Ohio.	1850
Thompson, J. Ford	Washington, D. C.	1866
Thompson, J. H.	Washington, D. C.	1868
Thompson, Jno. R.	Raleigh, N. C.	1851
†Thompson, Robert [d. 1865]	Columbus, Ohio.	1850
Thompson, Rezin	Nashville, Tenn.	1869
Thompson, Samuel	Albion, Ill.	1850
Thompson, Sidney	Spruce Creek, Pa.	1864
Thoms, Wm. Faulds	New York, N. Y.	1867
Thomson, David D.	Louisville, Ky.	1855
Thomson, George N.	Boston, Mass.	1865
†Thomson, Horatio	Belchertown, Mass.	1860
Thomson, Wm.	U. S. Army,	1867
Thomson, Wm. H.	New York, N. Y.	1864
Thorndike, William	Beverly, N. J.	1860
Thorne, James	Troy, N. Y.	1852
Thornton, Wm. H.	Eufaula, Ala.	1857
Thurm, Earnest Wm.	Nashville, Tenn.	1869
†Thweatt, J. J. [d. 1863]	Petersburg, Va.	1852
Tibbetts, L. P.	Cottage Hill, Ill.	1863
Tiffany, Russell H.	Canton, Conn.	1865
Tilden, Daniel, V. P.	Sandusky, Ohio.	1850
Titcomb, B.	Baltimore, Md.	1868
Tobie, E.	Erie Co., N. Y.	1863
Todd, Joseph Henry	Wooster, Ohio.	1869
Todd, L. Beecher	Lexington, Ky.	1859
Todd, R. N.	Indianapolis, Ind.	1867

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Todd, Seth J.	Washington, D. C.	1855
Tomlinson, George	Roadstown, N. J.	1865
Tompkins, Leander D.	Cassapolis, Mich.	1866
Tomson, J. J.	Davenport, Iowa.	1864
Toner, Joseph Meredith	Washington, D. C.	1864
Toothaker, Samuel A.	Wilmington, Mass.	1865
Torrey, Augustus	Beverly, Mass.	1865
Totten, Thomas H.	New Haven, Conn.	1855
Tourtellot, Lewis A.	Utica, N. Y.	1665
Towle, Samuel K.	Haverhill, Mass.	1865
Town, R. R.	New Albany, Ind.	1853
Towns, J. F.	Farmville, Tenn.	1857
†Townsend, Howard [d. 1867]	Albany, N. Y.	1858
Townsend, James C.	Glenn Cove, N. Y.	1860
Townsend, J. H.	Hasland, Ind.	1865
Townsend, J. H.	Edgarton, Ohio.	1867
Townsend, Morris W.	Bergen, N. Y.	1860
Townsend, R. H.	Philadelphia, Pa.	1848
Townsend, Solomon D.	Boston, Mass.	1849
Townsend, T. Beers	New Haven, Conn.	1864
Townsend, Wm. P.	Goshen, N. Y.	1864
Townsend, W. W.	Chatham, Pa.	1855
Tracy, Stephen	Andover, Mass.	1864
Traver, Wm. H.	Providence, R. I.	1865
Treadway, Fred. S.	Williamsport, Pa.	1865
Treadwell, Samuel	North Hampstead, N. Y.	1864
Treichler, S. K.	Jonestown, Pa.	1858
†Trenor, Jr., Jno. [d. 1867]	New York, N. Y.	1852
Trent, Peterfield	Richmond, Va.	1853
Trevitt, Wm.	Columbus, Ohio.	1850
†Trigg, Daniel	Abbingdon, Va.	1847
†Tripler, Chas. S., v. p. [d. '66]	United States Army.	1850
Tripp, Benjamin H.	Rutland, Mass.	1864
Trist, H. B.	Washington, D. C.	1866
Troth, Samuel N.	Philadelphia, Pa.	1863
Trow, W. M.	Haydenville, Mass.	1864
Trowbridge, S. T.	Decatur, Ill.	1854
Truesdell, Cilvin	Rock Island, Ill.	1863
Tucker, David H.	Richmond, Va.	1847
Tucker, D. M.	Chicago, Ill.	1863
Tucker, George G.	Westfield, Mass.	1853

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Tucker, Joshua	Boston, Mass.	1865
Tucker, Simeon	Stoughton, Mass.	1865
Tull, J. Graham	Newbern, N. C.	1853
Turnbull, Laurence	Philadelphia, Pa.	1852
Turner, Sylvester W.	Chester, Conn.	1860
Turner, W. A.	Mayfield, Ky.	1859
Turney, Isaac N.	Sommerville, Ala.	1863
Turpin, Charles	New Orleans, La.	1869
Tuttle, John T.	New York, N. Y.	1860
†Tweed, T. M.	Eckmansville, Ohio.	1850
†Twitchell, Amos	Keene, N. H.	1849
Twitchell, Geo. B.	Keene, N. H.	1848
Tyler, David A.	New Haven, Conn.	1864
Tyler, Grafton, V. P.	Georgetown, D. C.	1848
Tyler, John E.	Somerville, Mass.	1865
†Tyler, Samuel [d. 1856]	Frederick, Md.	1847
†Uhler, John [d. 1856]	Philadelphia, Pa.	1847
Uhler, John R.	Baltimore, Md.	1866
Underhill, Alfred	New York, N. Y.	1860
Updegraff, J. T.	Mount Pleasant, Ohio.	1854
†Upshur, George L.	Norfolk, Va.	1848
Upham, E. F.	West Randolph, Vt.	1865
Upham, J. Baxter	Boston, Mass.	1859
Van Buren, Peter	New York, N. Y.	1852
Van Buren, William H.	New York, N. Y.	1847
Van Buskirk, Wm. A.	Pottstown, Pa.	1853
Van Bibber, W. Chew	Baltimore, Md.	1865
Vanderpool, S. O.	Albany, N. Y.	1853
Vandervoort, John L.	New York, N. Y.	1864
Van Deusen, E. H.	Kalamazoo, Mich.	1864
Van Deusen, Harmon	Mineral Point, Wis.	1853
Van Dyck, Andrew	Oswego, N. Y.	1864
Vanharlingen, John	Lebanon, Ohio.	1850
Van Hovenberg, J. O.	Kingston, N. Y.	1860
Van Kleek, John R.	New York, N. Y.	1847
Van Patten, N.	Davenport, Iowa.	1854
Van Pelt, M. D.	New York, N. Y.	1851
Varick, Theodore R.	Jersey City, N. J.	1853
Vattier, J. L.	Cincinnati, Ohio.	1850

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Vaughn, Isaac P.	Glasgow, Mo.	1854
Voorhies, Wm.	Lisle, N. Y.	1864
Voss, Lothar	New York, N. Y.	1864
†Wade, T. A.	Brooklyn, N. Y.	1855
Wakefield, Horace P.	Reading, Mass.	1858
Wakefield, J. F.	S. Malden, Mass.	1865
Wales, Bradford L.	Randolph, Mass.	1849
Wales, John P.	Brandywine, Del.	1855
Walke, J. Wistar	Chesterfield, Va.	1851
Walker, Clement A.	Boston, Mass.	1865
†Walker, Isaac R.	Spread Eagle, Pa.	1848
Walker, J. B.	Union, Me.	1865
Walker, Joseph P.	Cincinnati, Ohio.	1855
Walker, J. R.	Wilmington, Ohio.	1867
Wallace, Edward	Reading, Pa.	1855
Wallace, Ellerslie	Philadelphia, Pa.	1858
Walser, Theodore	Tompkinsville, N. Y.	1864
Walsh, John Kearney	Washington, D. C.	1869
Wanzer, Hiram	Chicago, Ill.	1863
Ward, George A.	Holyoke, Mass.	1864
Ward, George Whitfield	Upton, Mass.	1865
Wardner, Horace	Cairo, Ill.	1869
Warfield, Jesse L.	Westminster, Md.	1848
Waring, J. J.	Savannah, Ga.	1858
Waring, Morton	Black Oak, S. C.	1851
Warner, Everardus B.	New York, N. Y.	1855
†Warner, Richard	Cromwell, Conn.	1848
Ware, Charles E.	Boston, Mass.	1853
†Ware, John	Boston, Mass.	1848
Warren, Edward	Baltimore, Md.	1849
Warren, George A.	Hopkinton, Mass.	1860
†Warren, John C., V. P.; P. [d. 1856]	Boston, Mass.	1848
†Warren, J. E.	Cumberland, R. I.	1856
Warren, Joseph H.	Boston, Mass.	1865
†Warren, J. Mason [d. 1867]	Boston, Mass.	1849
Warren, Royal S.	Waltham, Mass.	1865
Warren, Thomas D.	Edenton, N. C.	1858
Warren, William C., V. P.	Edenton, N. C.	1852
†Washburn, Cyrus [d. 1860]	Vernon, Vt.	1849

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Washington, James R.	St. Louis, Mo.	1853
Watkins, Claibourne	Little Rock, Ark.	1869
Watkins, E. V.	Newburg, Vt.	1865
Watson, A. A.	Boston, Mass.	1849
†Watson, John	New York, N. Y.	1847
†Watson, John M.	Nashville, Tenn.	1857
Watson, William	Dubuque, Iowa.	1857
Watters, John H.	St. Louis, Mo.	1859
†Watts, Robert [d. 1867]	New York, N. Y.	1847
Wayson, George W.	Baltimore, Md.	1848
Weatherly, Job Sobieski	Montgomery, Ala.	1868
Webb, Edwin	Hempstead, N. Y.	1860
†Webb, Reynold	Madison, Conn.	1849
Webb, William	Hillsboro', N. C.	1850
Weber, G. C. E.	Cleveland, Ohio.	1856
Weber, Leonard	New York, N. Y.	1864
Webster, E. K.	Boscawen, N. H.	1849
Weed, Samuel	Clyde, N. Y.	1864
Weeks, Cyrus	New York, N. Y.	1849
Weidler, Isaac C.	Leacock, Pa.	1854
Weidman, W. Murray	Reading, Pa.	1868
Weist, J. R.	Richmond, Ind.	1867
†Welburn, John C. [d. 1857]	Frankford, Mo.	1854
†Welch, Archibald	Hartford, Conn.	1848
Welch, Benjamin	Lakeville, Conn.	1850
Welch, James	Winchester, Conn.	1855
Welch, Samuel Mullins	Galveston, Texas.	1869
Welch, William W.	La Salle, Ill.	1854
Welch, William W.	Norfolk, Conn.	1855
Wellford, Beverly R., V. P.; P.	Richmond, Va.	1847
Wellford, J. Spottswood	Fredericksburg, Va.	1852
†Wellington, Timothy	West Cambridge, Mass.	1850
Wellington, William W.	Cambridgeport, Mass.	1865
Wells, B. P.	Niles, Mich.	1856
Wells, E.	Ann Arbor, Mich.	1856
Wells, Wm. Lehman	Philadelphia, Pa.	1866
Welsh, John H.	Norfolk, Conn.	1860
†West, Calvin, V. P.	Hagerstown, Ind.	1857
West, Henry	Clairsville, Ohio.	1850
West, Joseph O.	Princeton, Mass.	1865
West, M. Calvin	Rome, N. Y.	1864

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†West, Francis, s. [d. 1868]	Philadelphia, Pa.	1847
†West, Silas [d. 1859]	Binghampton, N. Y.	1856
Westmoreland, J. G.	Atlanta, Ga.	1859
Weston, James C.	Bangor, Me.	1854
Wey, William C.	Elmira, N. Y.	1864
Whaley, James S.	Rome, N. Y.	1863
†Wheatland, Richard H.	Salem, Mass.	1858
Wheeler, Lewis C.	Troy, N. Y.	1853
Wheeler, William G.	Chelsea, Mass.	1853
Whinney, Edw.	Fort Madison, Iowa.	1867
Whitaker, H. M.	Clarksville, Tenn.	1857
Whitaker, I.	Buffalo, N. Y.	1864
Whitbeck, John F.	Rochester, N. Y.	1864
White, A. A.	Baltimore, Md.	1866
White, A. M.	Easton, Md.	1853
White, Devillo	Sherburne, N. Y.	1849
White, James	Lancaster, Ohio.	1850
White, James C.	Boston, Mass.	1865
White, James P.	Buffalo, N. Y.	1849
White, John Buell	Saginaw, Mich.	1856
White, John F.	Cincinnati, Ohio.	1848
White, J. S.	Memphis, Tenn.	1859
White, J. W.	Stockport, Ohio.	1856
White, Moses C.	New Haven, Conn.	1860
White, Oliver	New York, N. Y.	1857
White, Roderick A.	Simsburg, Conn.	1853
White, R. G. P.	Pulaski, Tenn.	1857
†White, S. N. C.	Pooleville, Md.	1858
†White, Vassal	Curtisville, P. O., Mass.	1853
White, William T.	New York, N. Y.	1866
Whitehead, Wm. R.	New York, N. Y.	1868
Whitridge, John	Baltimore, Md.	1866
Whitridge, Wm.	Baltimore, Md.	1867
†Whitridge, Wm. C. [d. 1857]	New Bedford, Tenn.	1853
Whiting, Aug.	Charlestown, Mass.	1858
Whiting, Laurin G.	Chester, Vt.	1860
†Whitney, Simon	Framingham, Mass.	1849
Whittlesey, Henry N.	New York, N. Y.	1860
Whittemore, Jacob P.	Chester, N. H.	1858
Whittingham, Edward T.	Milburn, N. J.	1860
Wibble, B. M.	Louisville, Ky.	1859

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Wickersham, Swayne	Chicago, Ill.	1858
Wickes, Stephen	Orange, N. J.	1864
Wiggin, Henry L. K.	Auburn, Me.	1865
Wilbur, George	Mineral Point, Wis.	1854
Wilbur, H. B.	Syracuse, N. Y.	1860
Wilbur, L. F.	Honeoye, N. Y.	1864
Wilcox, Alexander	Philadelphia, Pa.	1851
†Wilcox, Charles H.	Buffalo, N. Y.	1853
Wilcox, Justus D.	West Granby, Conn.	1858
Wilcox, Lucian Sumner	Hartford, Conn.	1860
†Wilder, Charles W.	Leominster, Mass.	1850
Wilde, James	Duxbury, Mass.	1860
†Wiley, Adams	Roxbury, Mass.	1853
Wiley, Penrose	Leesport, Pa.	1858
Willard, Augustus	Green, N. Y.	1847
†Willard, Henry	Boston, Mass.	1855
†Willard, Sylvester D. [d. '65]	Albany, N. Y.	1860
Williams, Alexander	Chesterfield, S. C.	1851
Williams, A. G.	North Adams, Mass.	1865
Williams, A. L.	Brookfield, Conn.	1860
Williams, A. S.	Fostoria, Ohio.	1867
Williams, Bodisco	Georgetown, D. C.	1868
Williams, E.	Cincinnati, Ohio.	1865
Williams, Hezekiah	Alton, Ill.	1853
†Williams, Isaac C. [d. 1868]	Bloomington, Ohio.	1855
Williams, Lewis	Pomfret, Conn.	1855
Williams, Louis	Marion, Ind.	1867
Williams, P. C.	Baltimore, Md.	1867
†Williams, Stephen W.	Deerfield, Mass.	1847
Williams, William G.	Rodney, Miss.	1860
Williams, William H.	Brooklyn, N. Y.	1860
†Willis, Isaac P.	Royalston, Mass.	1860
Willis, John	Brimfield, Mass.	1864
Willis, John W.	Waltham, Mass.	1868
Wilson, Henry M.	Baltimore, Md.	1866
Wilson, A. Duncan	Brooklyn, N. Y.	1864
Wilson, C. P.	Cincinnati, Ohio.	1867
Wilson, Ellwood	Philadelphia, Pa.	1855
Wilson, H. P. C.	Baltimore, Md.	1858
†Wilson, James F. [d. 1868]	Wilmington, Del.	1849
†Wilson, Myron W.	Hartford, Conn.	1855

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Wilson, William J.	Potter's Mill, Pa.	1847
†Wiltbank, John [d. 1860]	Philadelphia, Pa.	1847
Windle, J. A.	Bluntsville, Ind.	1859
Wing, Henry	Collinsville, Ill.	1863
†Wing, Joel A. [d. 1852]	Albany, N. Y.	1847
Winslow, Joseph W.	East Hampton, Mass.	1865
Winsor, Frederick	Winchester, Mass.	1865
Winston, Charles K.	Nashville, Tenn.	1853
Winston, Gustavus S.	New York, N. Y.	1865
Winston, John D.	Nashville, Tenn.	1857
Winthrop, Henry	Charleston, S. C.	1851
†Winton, Nelson [d. 1864]	Havana, N. Y.	1853
Winton, William R.	Wabash, Ind.	1856
Wirtz, Horace Ralph	United States Army.	1864
Wise, T. N.	Covington, Ky.	1867
Wishard, Wm. H.	Greenwood, Ind.	1860
Wislizénus, Adolphus	St. Louis, Mo.	1854
Wister, Caspar, T.	Philadelphia, Pa.	1852
Withers, Thomas	Petersburg, Va.	1860
†Witherwax, John M. [d. '69]	Davenport, Iowa.	1850
†Witter, William	Willimantic, Conn.	1849
Wittig, Chas. F.	Philadelphia, Pa.	1866
Wittman, Carl	Brooklyn, N. Y.	1865
Wolcott, Samuel G.	Utica, N. Y.	1866
Womble, Pembroke M.	Baltimore, Md.	1858
Wood, A. C.	Owensboro', Ky.	1860
Wood, B. S.	Trenton, Ky.	1857
Wood, C. S.	New York, N. Y.	1867
Wood, George B., P.	Philadelphia, Pa.	1847
†Wood, Isaac, T. [d. 1868]	New York, N. Y.	1849
Wood, James R.	New York, N. Y.	1847
†Wood, R. C.	United States Army.	1858
Wood, Thomas	Muncy, Pa.	1847
Wood, Thomas	Cincinnati, Ohio.	1855
Wood, William	East Windsor Hill, Conn.	1853
Wood, Wm.	Cairo, Ill.	1854
Wood, W. Maxwell, U.S.N.	Owingo Mills, Md.	1848
Woodbridge, John Elliott	Neatsville, Ky.	1869
Woodburn, J. H.	Indianapolis, Ind.	1859
†Woodbury, Peter P.	Bedford, N. H.	1848
Woodhull, Addison W.	Newark, N. J.	1860

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Woodruff, A. D.	Haddonfield, N. J.	1855
Woodruff, William	Litchfield, Conn.	1856
Woodson, John C.	Spencerburg, Mo.	1854
Woodson, T. M.	Hannas P. O., Tenn.	1857
Woodward, Adrian T.	Brandon, Vt.	1853
Woodward, Ashbel	Franklin, Conn.	1849
Woodward, Charles	Cincinnati, Ohio.	1850
Woodward, Charles	Middletown, Conn.	1860
Woodward, Joseph Janvier, U. S. A.	Washington, D. C.	1865
Woodworth, Benjamin Studley	Fort Wayne, Ind.	1856
Woolen, G. V.	Indianapolis, Ind.	1867
Wooster, Joseph	New York, N. Y.	1849
Worcester, E. C.	Thetford, Vt.	1849
Workman, William	Worcester, Mass.	1853
Wormley, Theodore G.	Columbus, Ohio.	1864
Worrell, T. F.	Bloomington, Ill.	1863
Worsham, H. C.	Dinwiddie, Va.	1851
Wortham, A. G.	Richmond, Va.	1852
Worthington, Albert B.	Middle Haddam, Conn.	1864
Worthington, Wilmer	Philadelphia, Pa.	1848
Wotkyns, Alfred	Troy, N. Y.	1847
Wragg, William F., V. P.	Charleston, S. C.	1847
Wright, Albert A.	Canaan, Conn.	1848
Wright, Daniel Fleming	Clarksville, Tenn.	1859
Wright, J. Joel	Monrovia, Ind.	1859
Wright, James	Belmont, Ohio.	1850
Wright, John	Clinton, Ill.	1867
Wright, M. B.	Cincinnati, Ohio.	1850
Wright, Nehemiah	Chatham, Ill.	1863
Wyckoff, C. C.	Buffalo, N. Y.	1863
Wylie, A. N.	Ripley, Ohio.	1867
Yale, John	Ware, Mass.	1865
Yandell, D. W.	Louisville, Ky.	1850
Yandell, L. P.	Louisville, Ky.	1848
Yandell, Jr., Lumsford Pitt	Louisville, Ky.	1869
†Yardley, Thomas H. [d. 1860]	Philadelphia, Pa.	1847
Yeager, Theodore C.	Allentown, Pa.	1865
†Yearby, George T. [d. 1865]	Eastville, Va.	1852
Yeates, John L.	Baltimore, Md.	1848

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Young, D. W.	Aurora, Ill.	1859
Young, James T.	Washington, D. C.	1866
Young, Noble	Washington, D. C.	1848
Zabriskie, John L.	Flatbush, N. Y.	1859
Zeigler, George J.	Philadelphia, Pa.	1853
Zeigler, J. L.	Mount Joy, Pa.	1852
Zitzer, John Jacob	Carlisle, Pa.	1869

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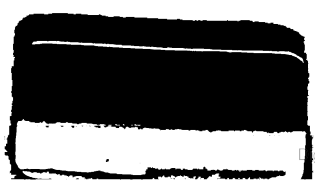

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